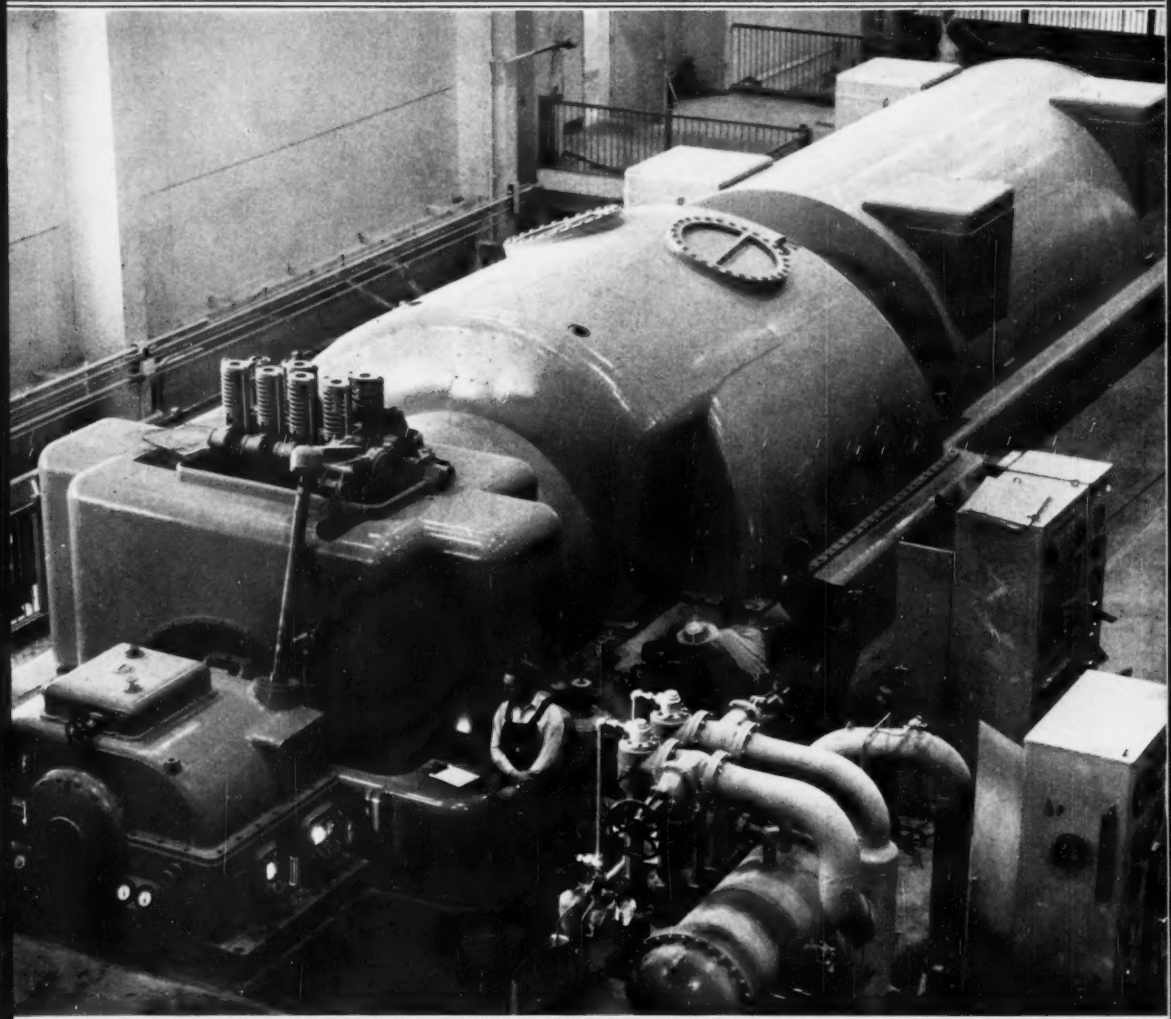
ELECTRICAL WEST

February 1949
25 cents



30th Annual Review and Forecast, Page 69
Appliance Sales Guide, Page 128

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

The appearance of the Edison-approved "Sunshine Lamp Package" is good news indeed. Embodied in these five lamps, good light for every room is being made available in one convenient purchase.

So the "Sunshine for Sale" sign is a welcome sight to customers. It means the opportunity to correct inadequate lighting in their homes with confidence, because they know the value of Edison approval in all things electric. That's protection for the family's eyesight.

It's a welcome sight for dealers too. Edison advertising in newspapers, magazines and through the mail is doing valuable pre-selling, bringing customers in. The cost of storing, handling and shipping merchandise is eliminated, because the "Sunshine Package" is delivered directly to each customer by the manufacturer. That's protection for your profits!

SOUTHERN CALIFORNIA EDISON COMPANY

type RF disconnects

AT DES MOINES SUBSTATION IOWA POWER AND LIGHT CO.

★ Nine G-E Type RF disconnects rated 161 kv with three G-E Type FK-439 oil circuit breakers

positive operation under

'glaze storm' and other

severe weather conditions

There's no need to worry about jammed or frozen switches when you use G-E Type RF disconnects. You get "easy operation" because the new blade-actuating mechanism is of simplified construction and antifriction bearings are used on all main moving parts. Also, the "sequential operation" movement firmly forces and locks the blade in the contacts under all weather conditions.

Silver-to-silver line-pressure contacts are used for all current-carrying duties. This means low contact losses and complete elimination of current-carrying braids. Controlled-contact pressure does away with unnecessary scoring, chewing and excessive wear on the silver contact surfaces. All these features mean better service and lower maintenance costs for you.

See your G-E sales representative about the new RF disconnects for 7.5 to 230-kv service. Write for bulletin GEA-4980. *Apparatus Department, General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

160-9

FEBRUARY 1949

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity". Contents copyright. Sixty-second year of publication

ELECTRICAL WEST

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NEXT MONTH

A pertinent topic will head the list of articles in the March issue. An experienced writer along public relations lines will present a point of view as to living with public power. It should be thought-provoking and certainly is pertinent in the West where this is not theory but reality. New developments in demand metering, using the differential register which gives an indication of premium demand, will be the subject of an interesting and valuable article. It will be particularly so for both power company and industrial plant engineers. The electrical features of the spectacular new General Petroleum building just completed in Los Angeles will also be both newsworthy and contain ideas and methods applicable to jobs of lesser magnitude. In the sales field, the big San Francisco market week will be reported in pictures and story, drawing from it significant things in the appliance business. A clever skit presented at the recent San Diego Bureau of Radio & Electric Appliances spring conference (reported in this issue) will be run practically in full. It is amusing but carries a message with a wallop. Other features will fill the March issue.

CONTENTS

The West's New Power Era 69

Highlights of electric utility operations in the Far Western states; comparisons of Western with the national operations.

Big Plans for 1949 72

Construction record for 1947; scheduled plant additions for year 1948, as reported by utility management of the West.

Dig for Gold in '49 100

Western utilization men report on merchandising policies, and promotions, on market saturation and probable demand.

DEPARTMENTS

Associations	122	New Products	42
Bulletins	50	Sales Guide	128
Editorials	120	Sales Guide News Letter	129
Electra's Husband	62	News	134

Cover: First of two 100,000-kw. turbogenerators being installed at Pacific Gas and Electric's station P. Photo by Don Krogh.

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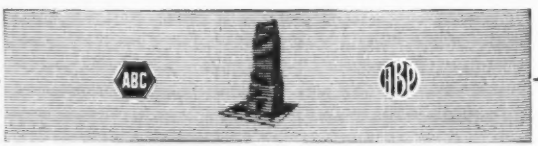

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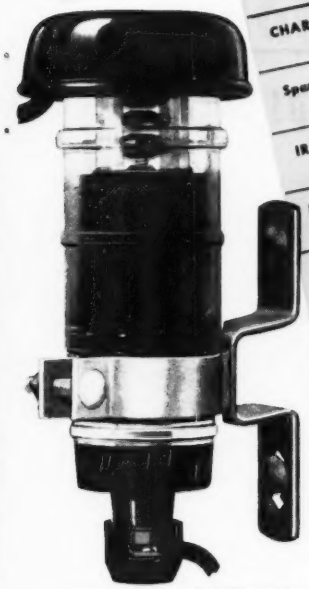
VOL. 102 NO. 2

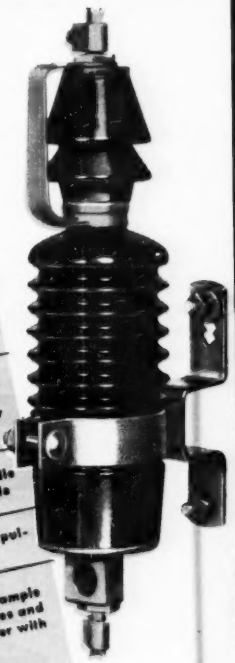
compare these characteristics

when you decide on Valve or Expulsion Type Arresters



L-M Heavy Duty
Type E Valve Type
Distribution Arrester

CHECK the characteristics your system requires		
CHARACTERISTIC	VALVE L-M Heavy Duty Type E	EXPULSION L-M Heavy Duty Type PF
Sparkover	Low—especially on steep front waves	Moderate—low enough for fast response
IR Drop	Low enough for ample transformer protection	Very low—practically none
Discharge Capacity	Very high—ample for all requirements	Very high. Ample for all requirements
Stability—long life	Extremely stable, with characteristics unchanged during long service	Exceptionally good, with very long life, though probably does not quite equal valve type
Follow-current control	Negligible follow current, causes no disturbance on the line; cut off at first current zero by valve action.	Very low for this type of arrester; promptly interrupted at first zero by exclusive wedge-chamber arc switching action
Back-up Fuse Links	No limitation on size as follow current drawn is extremely low	Must be large enough to handle follow current for a half cycle
Noise	Absolutely silent	About the same as an expulsion fuse.
Construction, features	Exceptional moisture sealing; double seals top and bottom. Glass housing for visual inspection of condition	Heavy duty construction; ample gas vent; heavy electrodes and horn fibre arcing chamber with wedge design



L-M Heavy Duty
Type PF Expulsion Arrester

• Some engineers prefer valve type arresters, some prefer the expulsion type, depending on their experience, requirements of the system, and location at which the arrester is to be used. Although expulsion arresters are often used in urban areas, they are more generally recommended for rural use, not only because they are noisy in expelling the arc following a surge, but mainly because the lower the system short-circuit current, the longer will be the life of the arrester.

Both types of L-M Arresters are heavy duty design, which assures many years of service and makes it possible to offer these arresters with no limit on system capacity.

Excellent bulletins are available on both types. Both are well illustrated, factual, informative. Write for either or both—**address Line Material Company, Protective Equipment Division, Milwaukee 1, Wisconsin.**

Bulletin on Heavy Duty Valve Type E L-M Arresters

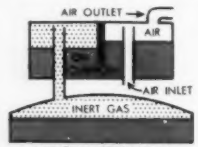
Bulletin and Handbook on Expulsion Type PF Arresters

LINE MATERIAL Lightning Arresters

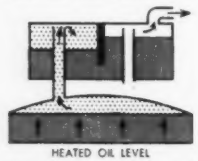
Complete Equipment for all distribution requirements

GPC Keeps pressures down when GAS PRESSURE COMPENSATED Controls pressure

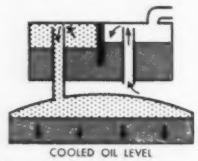
How Transformer Inert Gas Sealing System Works



Inert gas seals cooling oil from the atmosphere.



As transformer heats the transfer of gas is cushioned by change of oil levels.



As transformer cools, reverse action takes place.

TRANSFORMERS using the "Oil-Sealed" inert gas system of controlling internal pressure have been in successful operation for more than 24 years. Today, GPC Gas Pressure Compensated Cable uses a similar system to keep the internal pressure of power cables within safe limits.

Principle of Transformer Cooling System Sealed with Inert Gas

Transformer cooling oil is isolated from the atmosphere by inert gas and oil seal. As the transformer heats, the cooling oil expands, displacing inert gas from main tank to auxiliary tank. The transfer of gas is cushioned by the change in oil levels, keeping the main tank pressure low. As transformer cools the reverse takes place.

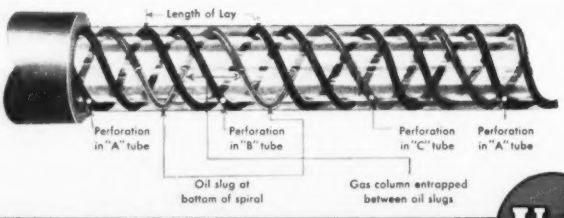
Principle of GPC Gas Pressure Compensated Cable

Like a transformer, this cable uses an inert gas, (nitrogen,) and insulating oil to keep the cable pressure within prescribed limits. The helical tubes shown in the diagram below are filled with dry nitrogen gas and are perforated at intervals. After cable installation, slugs of insulating compound collect in the low portions of the tubes while gas collects in the high portions. As the load is applied the insulating saturant (oil) expands and compresses the trapped gas which acts as a cushion to prevent development of pressures that would normally stretch the lead sheath. Upon cooling of the cable, the gas compressed in the tubes forces the oil saturant back into the cable, thus preventing wide swings from pressure to vacuum such as encountered in ordinary solid type cable.

This cable has proved highly satisfactory in use and carries heavy overloads without danger of sheath expansion. It is recommended for power plants, utilities, factories — wherever large amounts of power must be transmitted efficiently and dependably. Write for complete engineering information and installation details.

How Inert Gas Controls Pressure in GPC Gas Pressure Compensated Cable

As cable heats, gas is compressed in small tubes keeping pressure within prescribed limits.


Length of Lay
Perforation in "A" tube
Perforation in "B" tube
Perforation in "C" tube
Perforation in "A" tube
Oil slug at bottom of spiral
Gas column entrapped between oil slugs

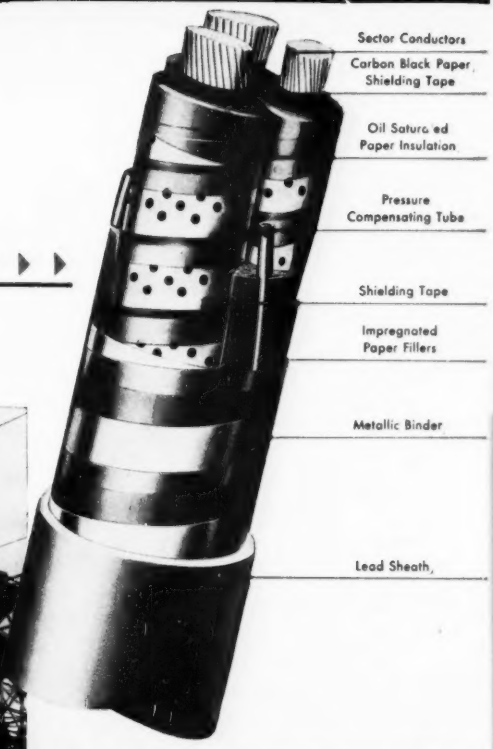
USS

the heat is on

PAPER CABLE

like a transformer

Power transformer with inert gas seal for controlling internal pressure without exposing cooling oil to the atmosphere.



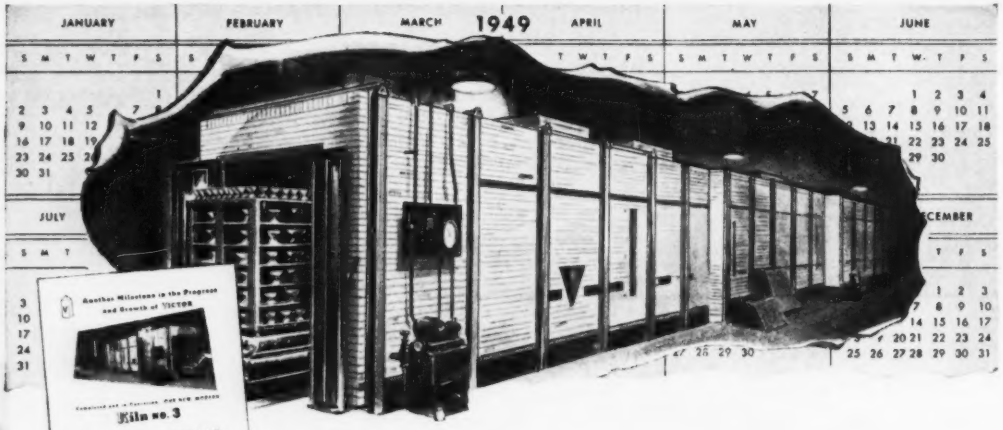
ADVANTAGES OF GPC "GAS PRESSURE COMPENSATED" CABLE

1. Insulation maintained thoroughly saturated with compound at all times.
2. Internal pressure is stabilized within prescribed limits.
3. Controlled sheath stresses. There is no repeated expansion and contraction, no fatigue or splitting of lead.
4. Pressure along cable line is uniform, not variable from joint to center of section to joint.
5. Interchangeability. Cable can be spliced to existing solid type cable without difficulty.
6. Increased current carrying capacity. Many present-day limits are based on allowable sheath stress. Type GPC Cable controls these stresses.
7. Improvement in operating voltage stress is possible, since ionization and gas inclusions are eliminated.
8. Reduced over-all transmission cost per KVA mile.
9. Continuous sheath supervision.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S Paper Insulated Cables

UNITED STATES STEEL



In 1948 we announced the completion of our new Tunnel Kiln No. 3.

NOW...ONLY 1 YEAR LATER

VICTOR'S KILN No. 4

IN FULL OPERATION

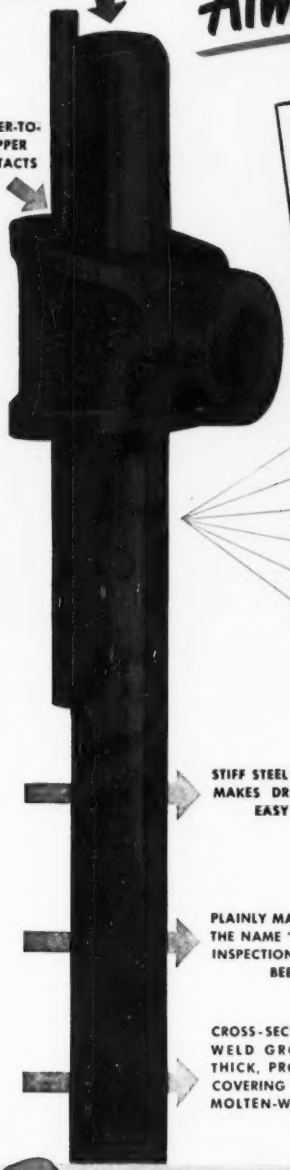
Proof that Victor, America's fast-growing insulator company, is geared to handle *your* demands for *Quality*, *Quantity* and *Dependable Deliveries* in high voltage insulators.

Leading power utilities and manufacturers insist on the famous wet-process porcelain insulators made by Victor because of their *unsurpassed performance*. These insulators are fired in the latest-design tunnel kilns with the most *modern* equipment—to assure dependability in mechanical and electrical properties. Victor ceramic engineers, electrical engineers and *skilled craftsmen* have the experience and know-how which combine to produce a product of uniform quality, uniform dimensions, uniform appearance! With our battery of modern kilns, we are better equipped than ever to serve your needs. We are at your immediate service for consultation on standard or special porcelain requirements.

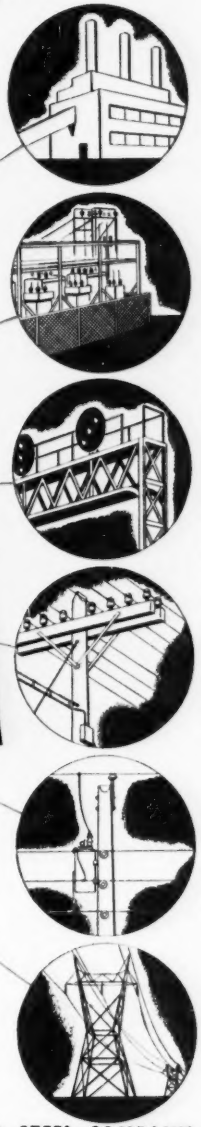
Always A GOOD POLICY

CHAMFERED END PREVENTS MUSHROOMING

COPPER-TO-COPPER CONTACTS



Insure Permanent Grounding Protection to Overhead Lines and Equipment by Using Copperweld GROUND RODS AND CLAMPS *it pays dividends!*



STIFF STEEL CORE MAKES DRIVING EASY

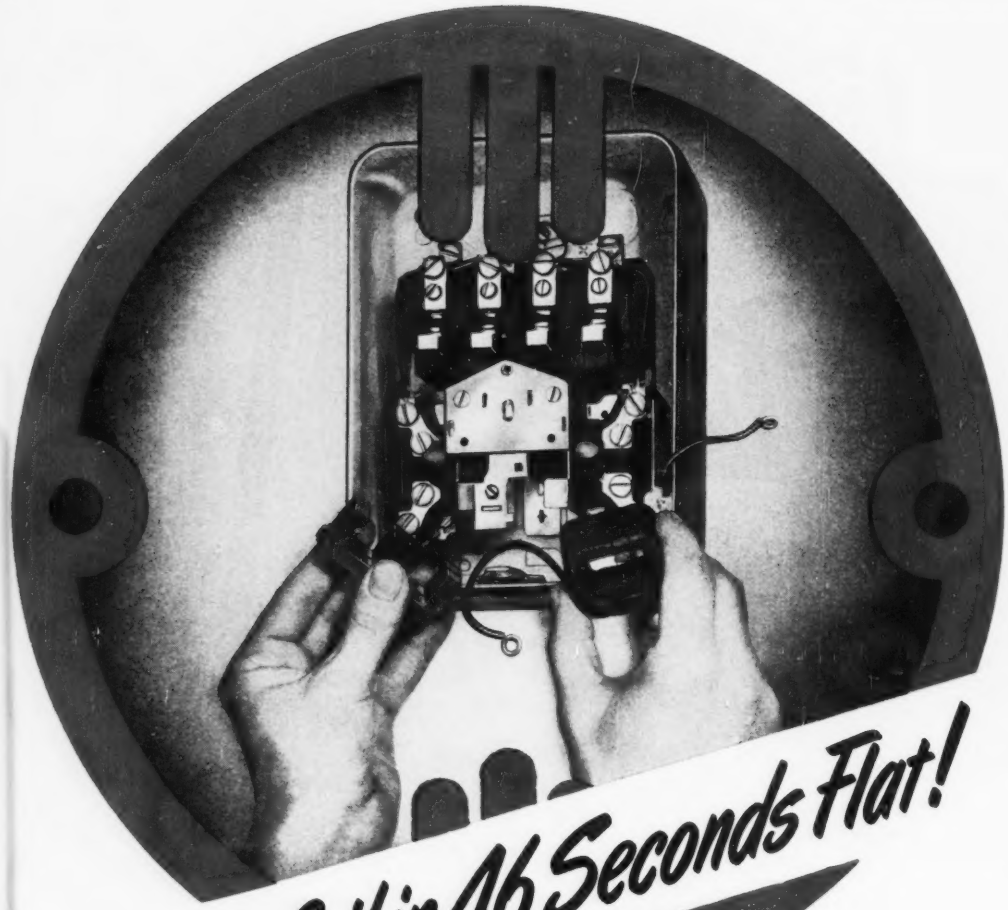
PLAINLY MARKED LENGTH AND THE NAME "COPPERWELD" AID INSPECTION AFTER ROD HAS BEEN DRIVEN.

CROSS-SECTION OF COPPERWELD GROUND ROD. THE THICK, PROTECTIVE COPPER COVERING IS PERMANENTLY MOLTEN-WELDED TO ALLOY STEEL.

Made by
COPPERWELD STEEL COMPANY
GLASSPORT, PA.
PACIFIC COAST OFFICE: MONADNOCK BLDG., SAN FRANCISCO

Copperweld GROUND RODS AND CLAMPS

stocked and sold by { HUBBARD & COMPANY, National Sales Agents and all their distributors and JOSLYN MFG. & SUPPLY CO., National Distributors



Change Coil in 46 Seconds Flat!

Change is FASTEST, EASIEST with Federal Noark Motor Starter

IT'S ALMOST "PRESTO, CHANGE!" replacing a coil in Federal Noark Motor Starters. Only three quick operations to get the old coil—three more, in reverse, to insert the new one. Federal design is the simplest, fastest on the market today. All parts readily accessible from the front. Saves time, effort and money.

What's more, there's almost no chance for trouble in Federal Noark Motor Starters. There's only one moving unit and that *rides on ball bearings*—an exclusive Federal feature!... Important, too, Federal permits the choice of getting automatic or manual reset instantly... simply turn a knob and you've the type of overload protection that you want.

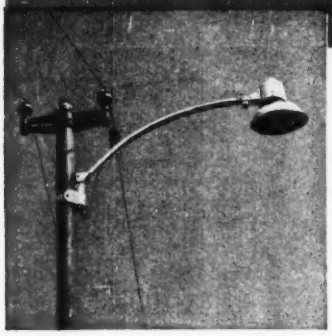
Order Federal Noark Motor Starters from your Federal Distributor. And write us for free copies of the "Federalog" and "Simplified Motor Control" giving full descriptions. Federal Electric Products Company, 50 Paris St., Newark 5, New Jersey.

FEDERAL NOARK

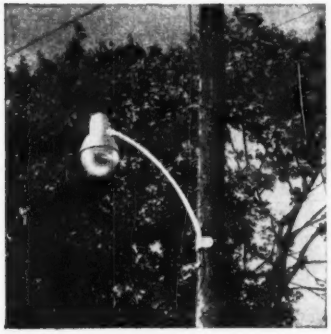
MOTOR STARTERS

Complete line of Federal Electric Products includes Motor Controls, Safety Switches, Service Equipment, Circuit Breakers, Panelboards, Switchboards, Bus Duct ★ Sales offices in principal cities.

HUBBARD ONE PIECE STREET HOOD BRACKETS



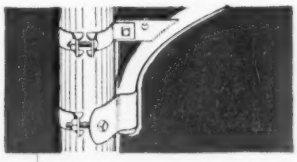
Installation on Steel Pole (See diagram)



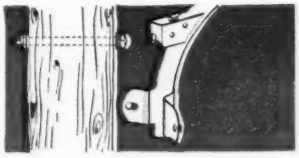
Installation on Wood Pole

ANOTHER FIRST– Hubbard, One Piece, Upsweep Brackets are a development in Street Lighting made necessary partly by the requirement for higher mounting of Luminaires, without setting new poles and without "wasting" pole space for bracket supports, and partly by a demand for greater simplicity and efficiency plus low cost. They can be mounted at the pole top if desired.

Furnished in lengths from three to six feet, these arms are all "one piece" design requiring no pole plates, braces, brace clips, insulator bushings or other fittings. They can be attached by one man. There are no sharp bends or other obstructions to hinder internal wiring. Complete data is forthcoming on these and greater lengths. Write for your copy.



Design of the Hubbard "One Piece" Street Lighting Bracket allows use on wood or steel poles merely by the application of pole bands. No change in design of the arm.

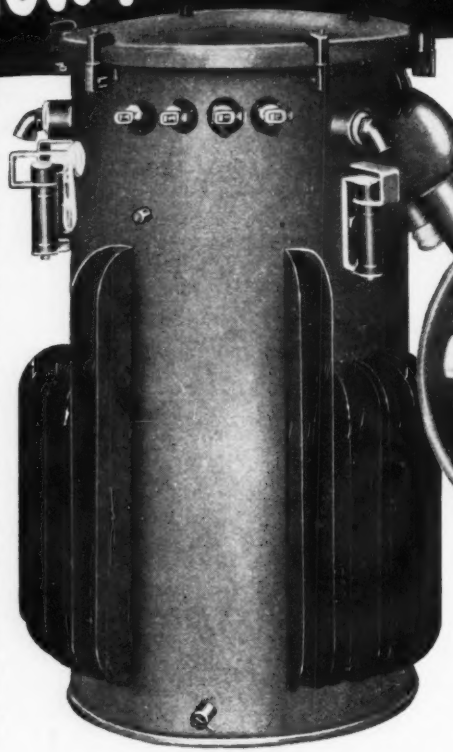


The new, exclusively Hubbard, Keyhole type (Patent applied for) of attachment above permits installation by one man.

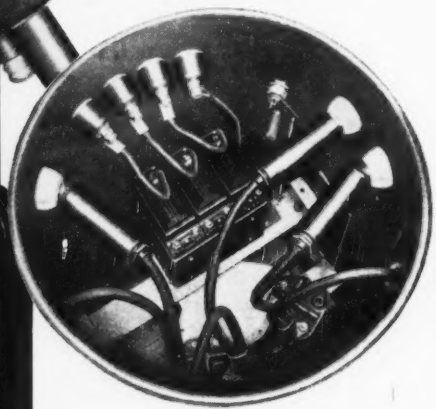
HUBBARD AND COMPANY

PITTSBURGH CHICAGO **OAKLAND, CALIF.**

New! CSP PROTECTION



SMALL, CLEAN, ATTRACTIVE—five ratings, 9 through 75 kva in standard voltages between 2,400 and 15,000 volts.



CO-ORDINATED—built-in circuit breakers match thermal characteristics of windings. "De-ion" lightning arresters, a part of the transformer, are designed to co-ordinate with the insulation of windings and bushings.

Reg. U. S. Trade-mark

YOU CAN BE **SURE**..
IF IT'S Westinghouse

IN 3-PHASE TRANSFORMERS

Completely Self-Protecting Advantages Are Extended for Heavy Urban Loads

The dependability and economy that have keynoted CSP* performance for rural and urban loads are now made available for "power" distribution by this new three-phase CSP distribution transformer.

All the principles of built-in, co-ordinated self-protection are combined in this easy-to-mount unit for stores, factories, pumping and other power loads.

1 Improved "De-ion" arresters safely bypass lightning surges away from vital insulation of the transformer.

2 Specially developed circuit breakers prevent burnouts but allow short-time overloads without interruption of service.

3 Installed, these CSP units cost no more than conventional transformers since there are no separate arresters or fuses.

What's more, actual operating records show fewer service calls, lower maintenance expense for these factory-built co-ordinated units.

Wherever distribution lines reach, the CSP design can be used to make service more dependable and more economical. Call your nearest Westinghouse Office for information. Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

ONLY THE BASIC CSP DESIGN

Gives you all 4!

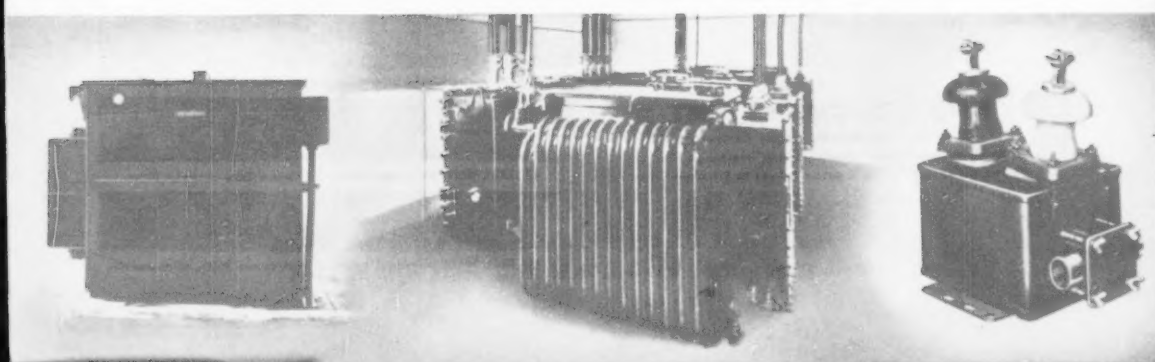
1. Low installation and maintenance cost through complete self-protection against
2. Lightning,
3. Short circuits and
4. Dangerous overloads

for single-phase, three-phase and banked secondary (CSPB).

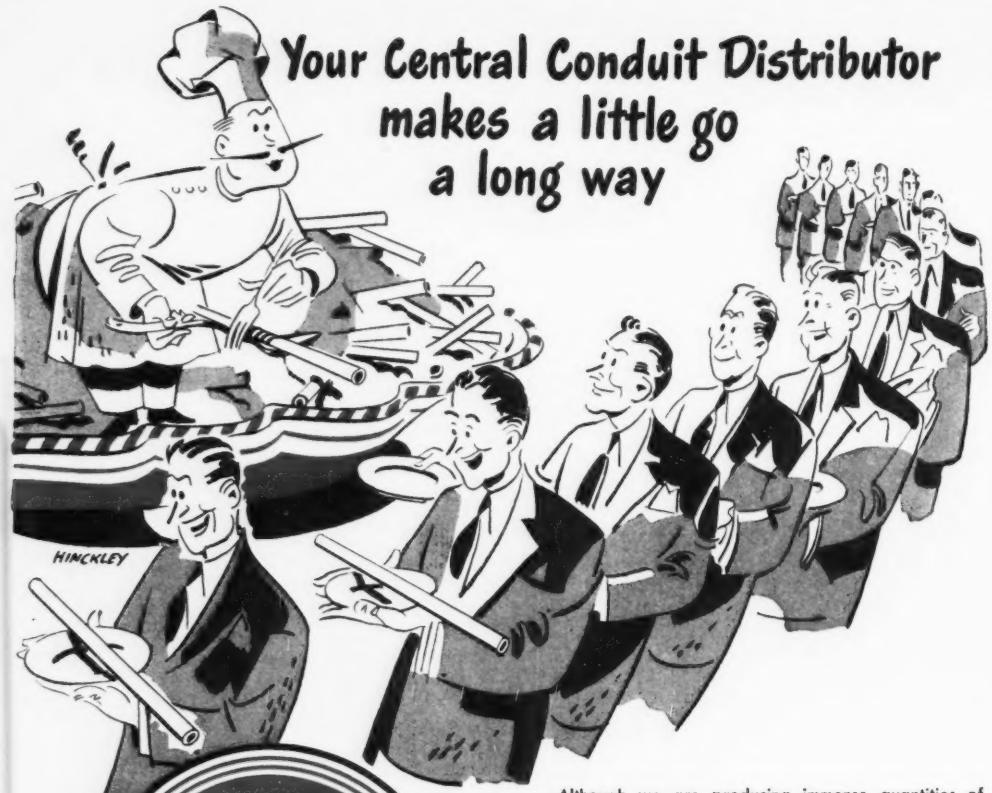
J-70521

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE



Your Central Conduit Distributor makes a little go a long way



CENTRAL
SPANG
CONDUIT

Although we are producing immense quantities of Central Rigid Steel Conduit, there just isn't enough to meet today's tremendous demand for it. Consequently, there may be times when your distributor will be unable to fill your complete order immediately.

But to make his limited supply go a long way, your Central Rigid Steel Conduit Distributor often makes partial deliveries. That's his way of making sure that you get a fair share of his supply.

Keep in touch with your Central Rigid Steel Conduit distributor. You will find him a dependable source for all kinds of electrical supplies.

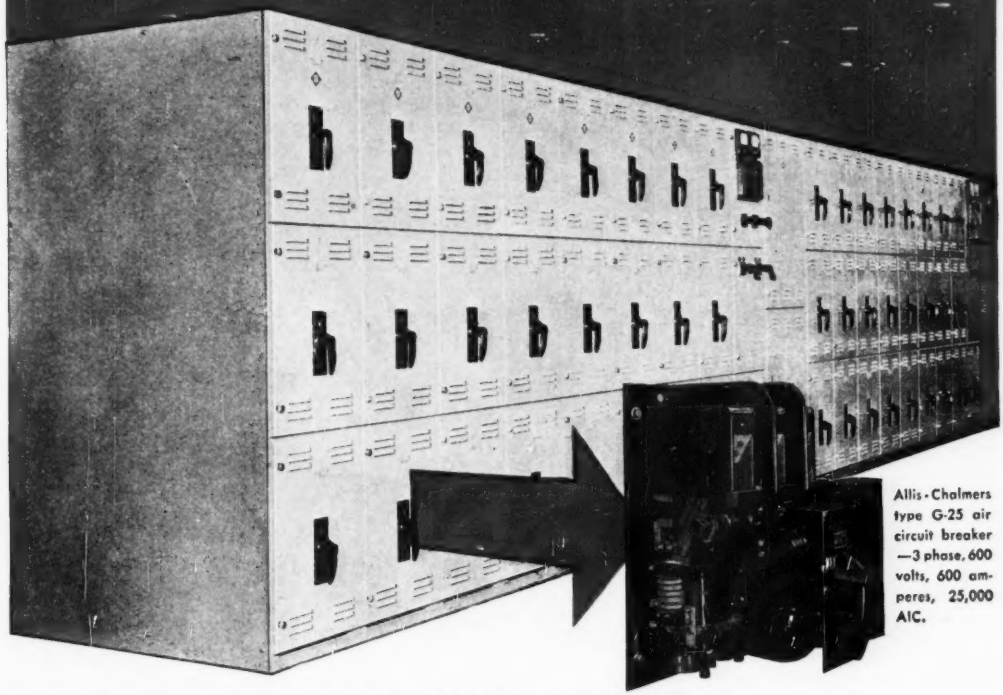
SPANG-CHALFANT
Division of The National Supply Company
General Sales Office: Grant Building, Pittsburgh, Pa.
District Offices and Sales Representatives in Principal Cities

CENLACO a hot dipped galvanized and lacquered finish, inside and out.

CENTRAL WHITE electro-galvanized outside and black enameled inside.

CENTRAL BLACK permanent, baked-on black enamel finish, inside and out.

ALLIS-CHALMERS LOW VOLTAGE METAL-ENCLOSED SWITCHGEAR



Allis-Chalmers type G-25 air circuit breaker —3 phase, 600 volts, 600 amperes, 25,000 AIC.

MODERN INSTALLATIONS NEED Modern Protection!

NEW INSTALLATION DESIGN demands *modern* switchgear . . . inside and out! On both counts you can depend on Allis-Chalmers metal-enclosed low voltage units.

You Save on Installation

Low voltage units are factory assembled and completely wired for easy installation . . . just bolt them down, complete cable connections and put into operation. Maintenance is easier, too, because adjacent circuits need not be disturbed when inspecting drawout units. Simply replace the withdrawn breaker with a spare and the circuit is back in operation.

Dependable Interruption

Allis-Chalmers type G air circuit breakers are insensitive to shock and vibration under normal duty. Allis-Chalmers low voltage switchgear is available for 600 volts a-c and below where 15,000 to 100,000 amperes interrupting capacity is required.

For more details call your nearest A-C office or write direct.

A 2591

ALLIS-CHALMERS, 939A SO. 70 ST. MILWAUKEE, WIS.

ALLIS-CHALMERS

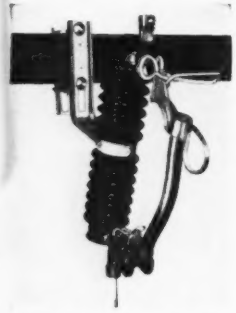
First in the U. S. with Metal-Clad Switchgear

Rigid mounting bracket of hot dip galvanized two-inch channel iron.
High quality wet process glazed porcelain insulator.
Flat spring of K-Monel metal maintains even pressure on fuse button.
Weather resistant Kearnite fuse tube possesses heavy arc-extinguishing fibre lining.
Auxiliary contacts are silver plated.

You Are Getting the Best Fuse Cutout Available When You Use

KEARNEY

Series "T" TRIP-OUTS



As with all other Kearney Fuse Cutouts the Type "T" Trip-Out can be converted to a disconnect switch by the substitution of a disconnect blade for the fuse cartridge.

Significantly superior to the average fuse cutout, the Kearney Series "T" Trip-Out represents the very latest developments.

In brief, features of this cutout are: Silver to silver contacts to accommodate heavy loads and to preserve current carrying efficiency. Simplified toggle cartridge release at upper end of the cartridge to make sure of the tripping action on very light as well as heavy fault currents. Heavier cartridge trunnions and switch hinges for guiding the cartridges into the switch contacts.

Try this new, improved design now.

FOR BETTER CONSTRUCTION AND MAINTENANCE

Always Specify KEARNEY PRODUCTS *for the Job*

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

4224-42 CLAYTON AVE. – ST. LOUIS 10, MISSOURI

Canadian Plant, Guelph, Ontario

JRK-122

West Coast Distributor: **MAYDWELL and HARTZELL,** INC.

CARRY A BIGGER LOAD WITH SMALLER WIRE

FOR LESS MONEY

Use Rome Type RH Building Wire

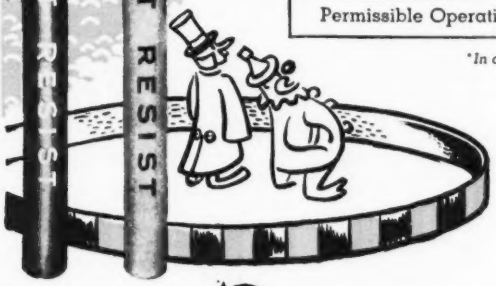
When you figure on wire or cable for industrial feeder circuits, *where voltage drop is not a problem,* be smart and figure on using Rome Type RH (Heat Resistant) Building Wire.

As compared to all other types of Building Wires, the National Electrical Code current carrying capacities and higher operating temperatures for Type RH, permit, for equal amperages, the use of smaller conductor sizes in nearly every instance. That's why, with Rome Type RH you can often use a smaller cable, at less cost, for the same current load.

Here is a typical comparison* with circuit requirement of 285 amperes:

	Type RH	Type R
Required Conductor Size	300,000 CM	500,000 CM
Approximate Outside Diameter	.91″	1.10″
Weight per 1000 ft.	1139 Lbs.	1815 Lbs.
Required Conduit Size (3 conductor)	2½″	3″
Permissible Operating Temperature	75° C	60° C

**In accordance with 1947 National Electrical Code*



Underwriters' Approved

YOU CAN SAVE...

- On initial cost—in this case as much as 26 percent.
- By use of smaller conduit and fittings.
- In ease of handling lighter materials.

Further, there is longer life in this superior heat-resistant insulation.

FIGURE IT IN ROME TYPE RH AND SAVE

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

PACIFIC COAST SALES OFFICES

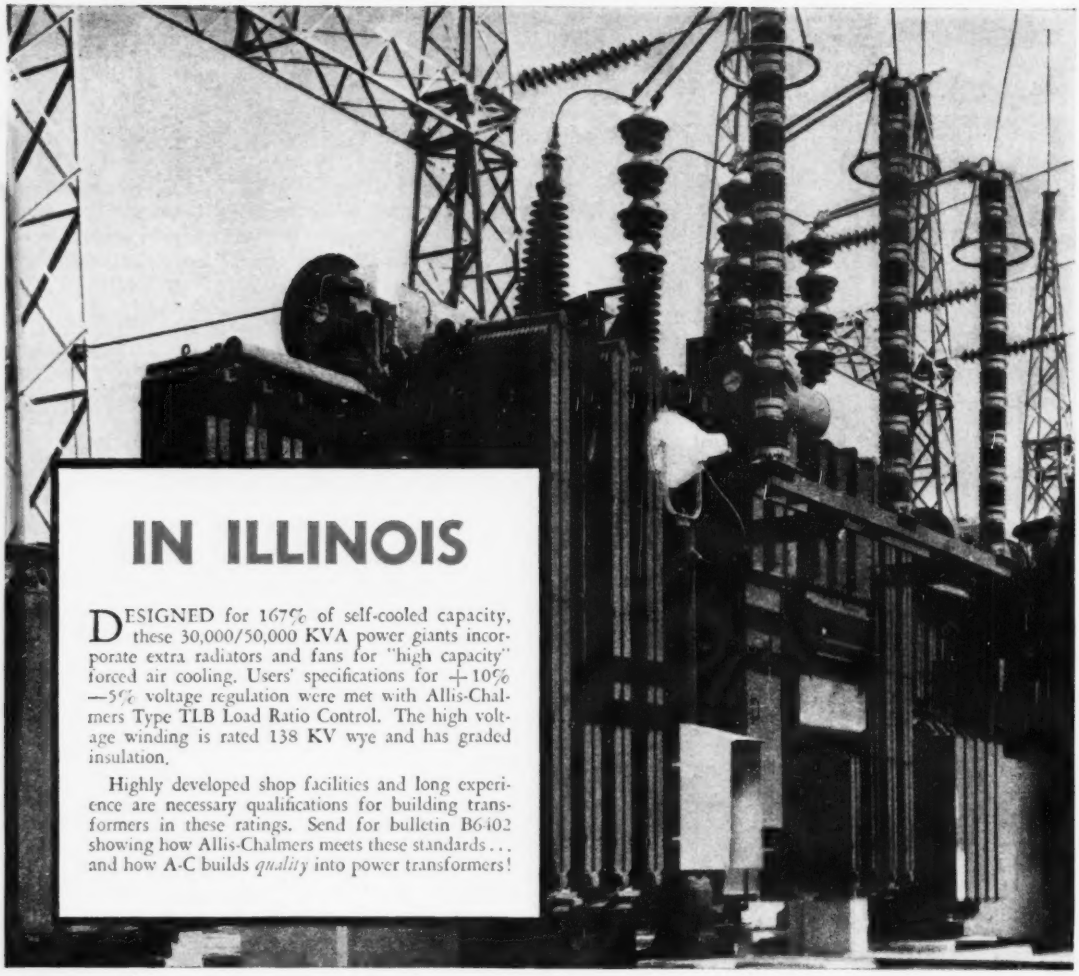
SALT LAKE CITY 1, UTAH
462 Union Pacific Annex Bldg.

LOS ANGELES 21, CALIF.
2038 Bay Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
3404 Fourth Ave., So.

Power Transformers



IN ILLINOIS

DESIGNED for 167% of self-cooled capacity, these 30,000/50,000 KVA power giants incorporate extra radiators and fans for "high capacity" forced air cooling. Users' specifications for +10% —5% voltage regulation were met with Allis-Chalmers Type TLB Load Ratio Control. The high voltage winding is rated 138 KV wye and has graded insulation.

Highly developed shop facilities and long experience are necessary qualifications for building transformers in these ratings. Send for bulletin B6402 showing how Allis-Chalmers meets these standards . . . and how A-C builds *quality* into power transformers!

AC

. . . means Quality Power Transformers

Circular coils withstand high stresses. Coils are rigidly braced, vacuum dried, and treated.

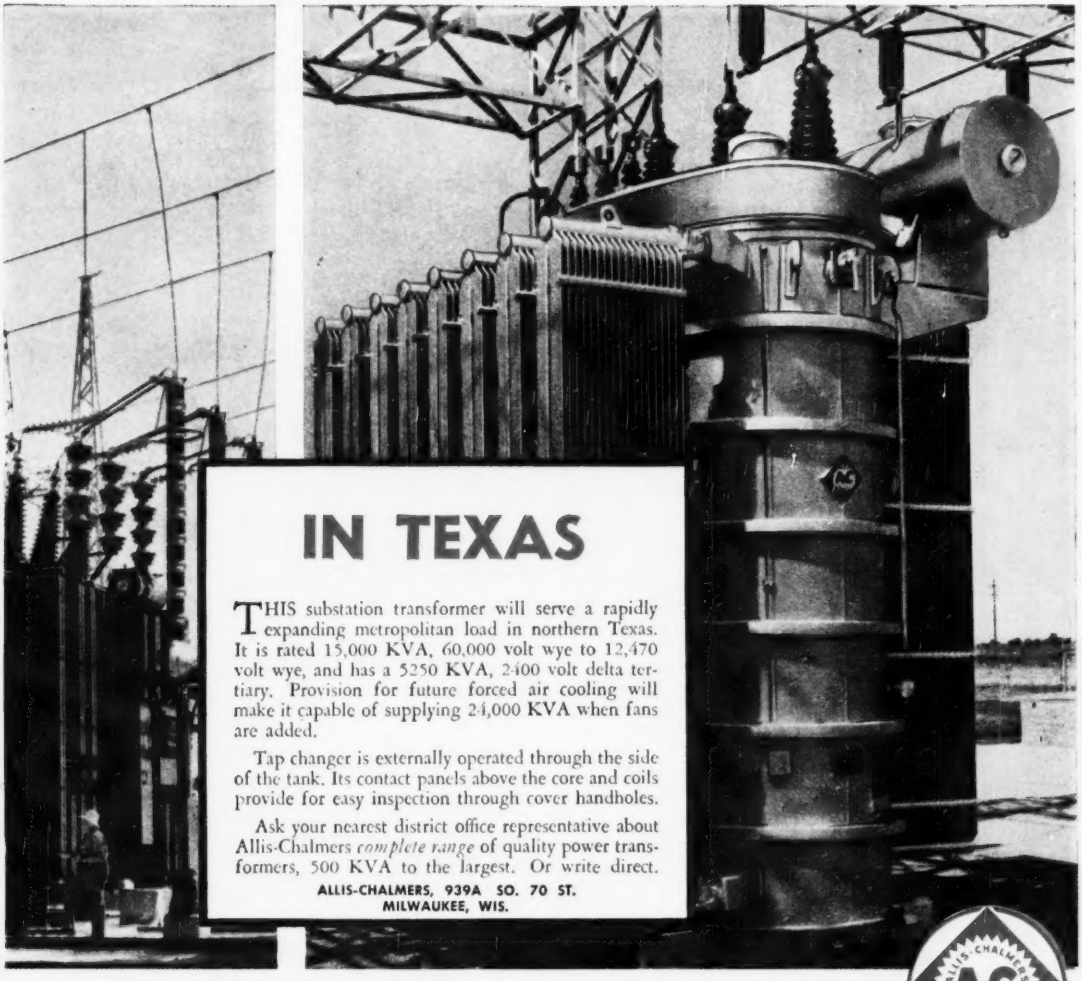
"Capacity Tailored" Load Ratio Control, featuring Allis-Chalmers 32-step regulation.

Controlled gasket compression insures correct pressure . . . increases life, effectiveness.

Strong, fin-type radiators rigidly braced. Staggered construction simplifies repainting.

Proved Oil-Sealed Inert Gas Protection provides simple, positive oil preservation.

"ON THE LINE!"



IN TEXAS

THIS substation transformer will serve a rapidly expanding metropolitan load in northern Texas. It is rated 15,000 KVA, 60,000 volt wye to 12,470 volt wye, and has a 5250 KVA, 2400 volt delta tertiary. Provision for future forced air cooling will make it capable of supplying 24,000 KVA when fans are added.

Tap changer is externally operated through the side of the tank. Its contact panels above the core and coils provide for easy inspection through cover handholes.

Ask your nearest district office representative about Allis-Chalmers *complete range* of quality power transformers, 500 KVA to the largest. Or write direct.

**ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.**

ALLIS-CHALMERS

A 2622

Pioneers in Power and Electrical Equipment From Generation Through Utilization

G&W
ELECTRIC
SPECIALTIES
Originators and pioneers of equipment for sound methods of underground and overhead electric distribution.
TYPE "RA"
OIL SWITCHES
FOR VERSATILE SECTIONALIZATION AND ISOLATION OF CABLE CIRCUITS
G&W Type "RA" load break oil switches materially reduce the time required for restoring service in case of trouble, or for isolating a circuit to make changes. We shall be pleased to send you data on various styles for your standard and special needs.
G&W ELECTRIC SPECIALTY COMPANY
7780 DANTE AVENUE, CHICAGO 19, ILL.
In Canada, Powerlite Devices, Ltd., Toronto

WHEREVER THEY SERVE— LOOK FOR LONG LIFE

In today's many-sided industrial picture . . . with today's installation costs, only the longest-lived wires and cables are economical. Okonite wires and cables, built to stand up better and longer, offset high installation costs.

In realizing this goal, there are many "musts" for Okonite. Up-river fine Para rubber, for example, goes into Okonite cable insulations because it provides *all* needed factors. Okonite's strip insulating process is used because it assures perfect centering of conductors. Vulcanizing is done in a continuous metal mold so that every foot of cable gets uniform treatment — a practice that's standard only with Okonite.

In addition to a-c tests, Okonite subjects its cable to high voltage d-c tests more severe than used by any other cable manufacturer. Long time heat runs prove the stability of Okonite insulations. And these tests are checked not only by the accelerated-aging oxygen bomb, but by the slow, sure, year-after-year weather exposures made in Okonite's proving ground —a permanent outdoor cable laboratory. For detailed descriptions of Okonite "musts," write for your copy of illustrated 32-page Research Bulletin WE101 The Okonite Company, Passaic, New Jersey.

OKONITE OKONITE SINCE 1878 **insulated wires and cables**

THE BEST CABLE IS YOUR BEST POLICY

NEW KYLE

TYPE "L" OIL CIRCUIT RECLOSER

Now you can have Kyle recloser protection for lines with loads up to 100 amperes and fault currents as high as 4000 amperes.

These heavy fault currents can be handled successfully because of a new cross blast method of arc extinction, explained and illustrated below.

SOME FEATURES OF THE NEW KYLE TYPE L

Phase to phase operating voltage 2.4 to 15 kv.

Ratings: 25, 35, 50, 70, and 100 amps. for minimum tripping currents of 50, 70, 100, 140, and 200 amps, respectively

Permits precise coordination with line or back-up fuses, sectionalizers, other reclosers, and breakers.

Insulation level meets requirements for 15 kv station equipment.

Impulse level 110 kv.

Control mechanism fully hydraulic; virtually free from variations caused by oil temperature-viscosity changes; rugged, shock-proof, trouble-free.

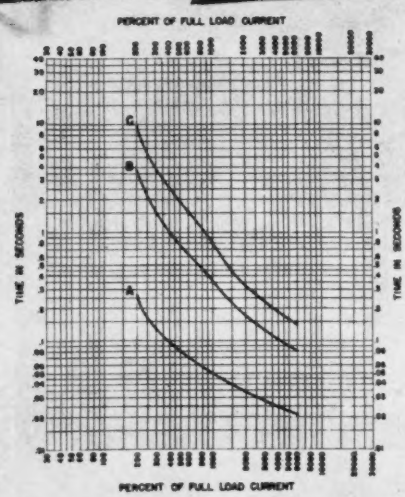
Size: approximate overall height 37 inches; tank diameter 11 inches; weight, complete with oil, 170 pounds.

Choice of Operating Sequences . . .

Refinements in the new type L hydraulic control mechanism provide greater accuracy of timing and a wider selection of characteristics.

Standard sequence is two fast operations, two retarded. This standard sequence is represented in the chart at left by two curves A and two curves B. *Optional sequences*, easily changed in the field by adjusting the time selector plate or adjusting one small part are: four fast operations (four curves A); *or* two fast and two extra-retarded (two curves A, two curves C). Various other sequences are available from the factory.

Time Current Curves!



New oil cross blast arc extinction!

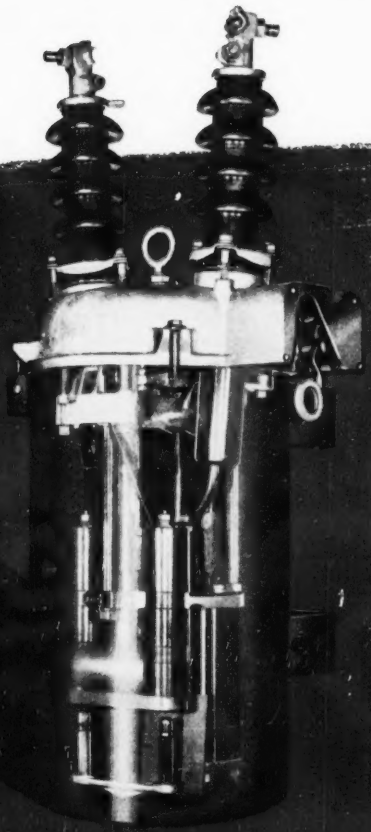
This unique design provides rapid arc extinction, with minimum arcing time, and freedom from restrikes at *all current values and power factors* within the recloser rating. Arcs are drawn in series. The heavy contacts are independently housed, one in a pressure chamber, the other in the venting chamber. Gas formed in the pressure chamber cross-blasts oil into the venting chamber, extinguishing the arc.

- Pressure Chamber
- Cross Blast Chamber
- Venting Chamber
- Copper Tungsten Contact Tips
- Quick make, quick break contact action

Manufactured by Kyle Company
division of Line Material Company

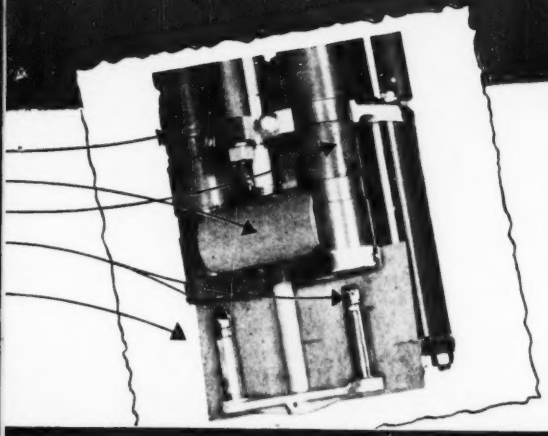
LM KK LINE MATERIAL

WITH UP TO 4,000 amps Interrupting Capacity



The new type L has all these outstanding Kyle Recloser features

- Three reclosures before locking out, with a choice of operating characteristics
- Coils interchangeable in the field
- Trip-free operating handle . . . many other safety features
- Large cast aluminum cover, sealed construction, with four hold-down lugs. Cover and mechanism may be rotated in steps of 90 degrees for most convenient operating position
- Generous-size sleet hood integral with cover, protects operating handle and counter
- Sturdy lifting eye
- Mounting brackets meet EEI-NEMA standards for small transformers



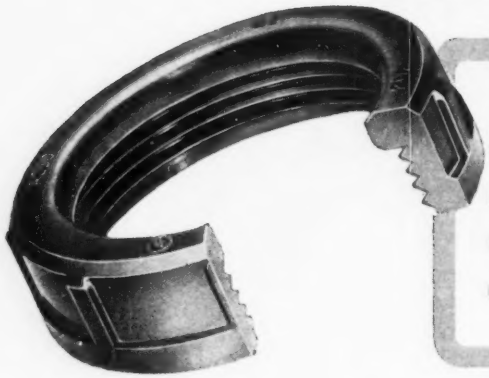
Read all about it!

This fast-moving bulletin gives details, explains operation, in pictures and few words. Ask the L-M Field Engineer for a copy, or let us send you one. Address Line Material Company, Kyle Company Division, Box 2077, Milwaukee 1, Wis.

KYLE RECLOSERS . . . *also Complete Coordinated Equipment for All Distribution Requirements*

O. Z.'s *NEW* ALL-BAKELITE BUSHINGS

BEST BY TEST!



Results of Independent Laboratory Tests*

TORQUE ..... O. Z. *PROVED* 36% *STRONGER* than other bakelite bushings tested.

IMPACT ..... O. Z. *PROVED* 44% *STRONGER* than other bakelite bushings tested.

TENSILE STRENGTH .... O. Z. *PROVED* 112% *STRONGER* than other bakelite bushings tested.

FLAT COMPRESSION .... O. Z. *PROVED* 32% *STRONGER* than other bakelite bushings tested.

Now O. Z. offers you the strongest all-Bakelite insulating bushings made — 56% stronger overall than other Bakelite bushings tested in independent laboratory tests (results above) — they bounce like a ball if dropped, won't break even on concrete. And for fast, easy installation and permanent protection, O. Z.'s provide these *plus* features:

- **Smooth, rounded edges completely protect wire insulation during pulling and when in service.**
- **Clean, deep threads let you spin-on the bushing with a twist of the wrist.**
- **Ribbed outer surface provides a grip for slippery hands and permits tapping with screw driver.**

O. Z. Bakelite bushings cost no more than other Bakelite bushings, are fully approved by Underwriters' Laboratories and are available in sizes from ½ inch to 6 inches. Samples sent on request.

**Name and photostatic copy of report will be furnished if you wish.*

NET TRADE PRICES

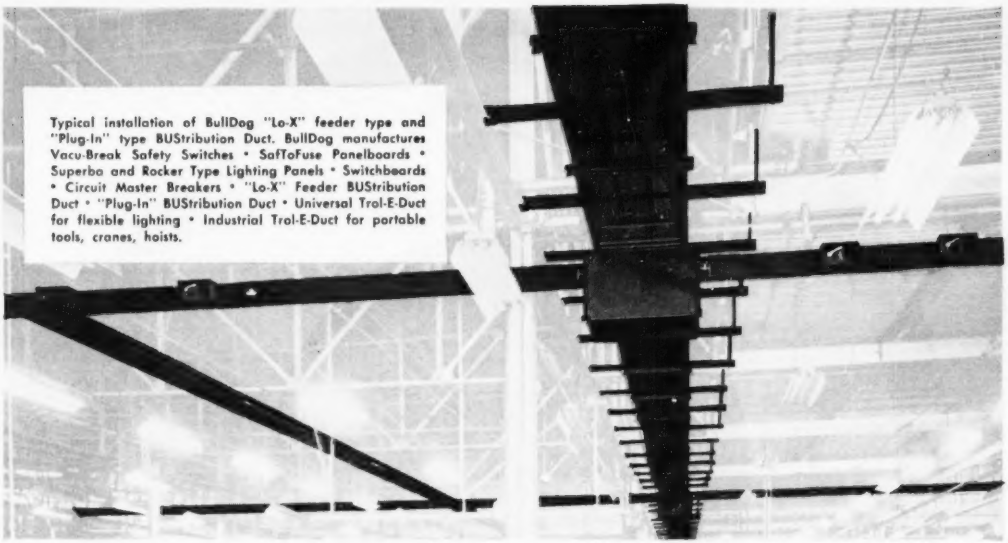
Cat. No.	Pipe Size	Std. Pkg.	Ctn. Qty.	Lbs. Wt. Per 100	Less Carton Price Per 100	Carton Qty. Price Per 100	Std. Pkg. Price Per 100
A-50	½"	400	100	1½	$ 4.60	$ 3.60	$ 2.90
A-75	¾"	400	100	2	5.75	4.50	3.60
A-100	1"	200	50	3	9.20	7.20	5.75
A-125	1¼"	100	25	4½	26.50	20.30	16.25
A-150	1½"	100	25	6½	30.00	23.40	18.75
A-200	2"	40	20	9	36.00	28.10	22.50
A-250	2½"	20	20	14	58.50	—	36.50
A-300	3"	10	10	18	64.00	—	40.00
A-350	3½"	10	10	22	80.00	—	50.00
A-400	4"	10	10	25	96.00	—	60.00
A-500	5"	5	5	34	210.00	—	130.00
A-600	6"	2	2	45	400.00	—	250.00

CONDUIT FITTINGS • CABLE TERMINATORS
CAST IRON BOXES • GROUNDING DEVICES
SOLDERLESS CONNECTORS • POWER CONNECTORS

Buy O.Z. and you'll see why Engineers say, "They're OK if they're O.Z."

4820

O.Z. ELECTRICAL MANUFACTURING COMPANY, INC.
262 BOND STREET · BROOKLYN 2, N. Y.



Typical installation of BullDog "Lo-X" feeder type and "Plug-In" type BUStribution Duct. BullDog manufactures Vacu-Break Safety Switches • SafToFuse Panelboards • Superbo and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution Duct • "Plug-In" BUStribution Duct • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

Power with a foolproof future

CAN you foresee the many changes which may come to your plant in the next five or ten years?

Naturally not! But when it comes to electrical power distribution, BullDog BUStribution systems offer flexibility to meet any change the future holds.

Take machine layout changes: With BullDog "Plug-In" BUStribution Duct, moving machinery is like moving household appliances—simply unplug machine from duct, move, and plug in at new location.

If necessary, your entire BUStribution system can be easily and quickly dismantled, moved, and set up . . . without scrapping a nut or bolt—it's flexible and salvable.

BullDog "Lo-X" BUStribution Duct, for secondary feeders, is prefabricated to exact performance standards. Ventilated construction and paired-phase arrangement of silvered-copper bus bars reduces temperature rise, assures high current-carrying capacity and reduces reactive voltage drop. BUStribution Duct is sturdily built for years of finest service.

Your local BullDog Field Engineer will be glad to show you a BullDog BUStribution system in your own neighborhood. Let him look over your requirements and answer your questions.

BullDog Field Engineers welcome the opportunity to sit in with you during the early planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation costs, as well as efficiency and reliability in actual operation. Why not take advantage of this service?

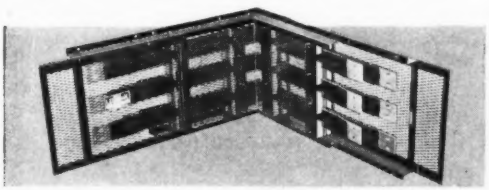
BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

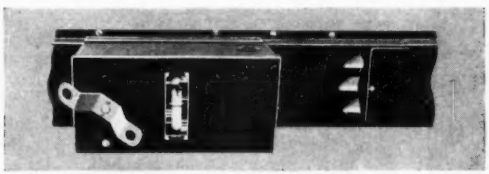
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION



Section of "Lo-X" BUStribution Feeder Duct, used for main secondary power feed. "Lo-X" Duct is prefabricated in ten-foot lengths, in capacities from 600 Amps. to 4000 Amps., 600 Volts or less. Close spacing and paired-phase arrangement of bus bars reduces reactive voltage drop.



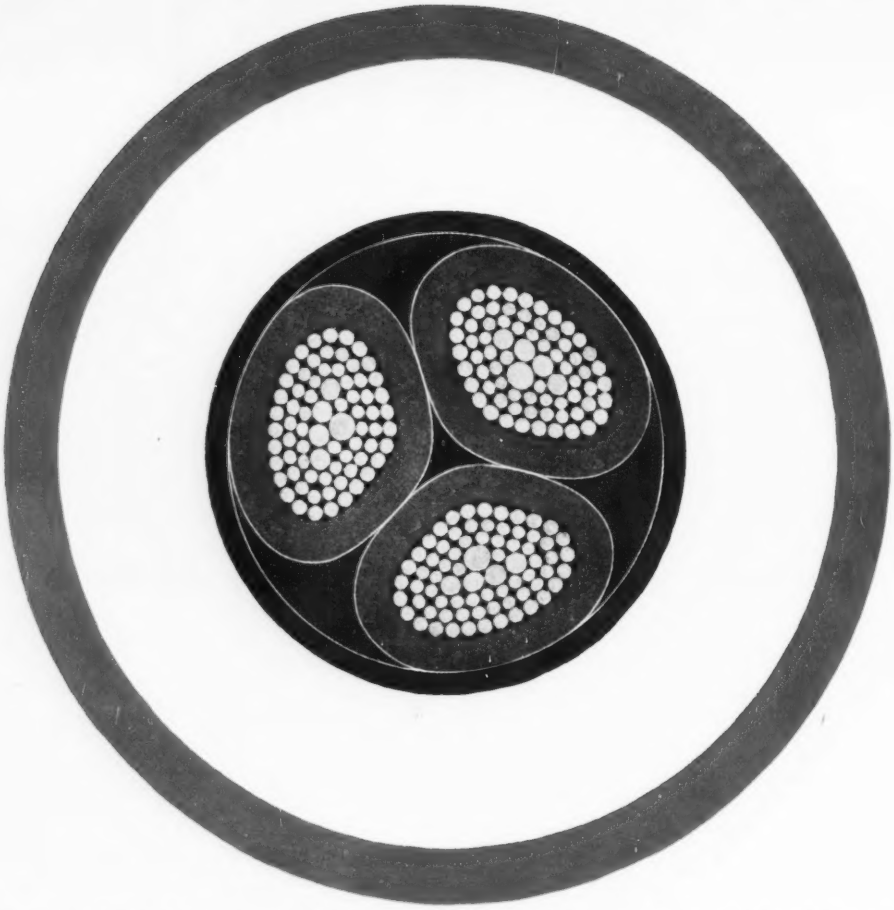
Section of "Plug-In" Duct, showing Vacu-Break Bus Plug for tap-off purposes. Crescent-shaped openings make it impossible to insert plugs incorrectly. Each ten-foot section of "Plug-In" Duct has ten such openings. Capacities: 200 Amps. to 1350 Amps., 600 Volts or less.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue Tel. Garfield 2844
Portland 12, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.



When you buy a Simplex Paper Insulated Cable:—

—Experienced cable engineers will make careful field studies of your operating conditions and special problems and will design a special Simplex Paper Cable to give you efficient service. If you prefer, the cable will be manufactured to your specifications.

—The insulating paper and the oil have been selected after much research to find materials that are completely compatible and will give you the operating characteristics you want in your cable.

—The equipment used to manufacture your cable will be completely up-to-date. The tensions, overlays, vacuums, impregnating machinery are all automatically controlled and all are carefully chosen to produce optimum results in the finished cable.

—The work will be done by experienced workmen under expert supervision.

—Tests will be made during manufacture and before shipment to be sure the cable meets your specifications and our rigid requirements.

—The cable you will get will be your cable — custom-made for you.

Bulletin #109 — Simplex Paper Insulated Cable — will be sent upon request.

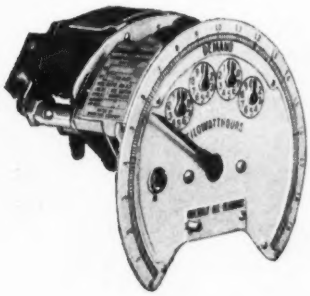
Simplex

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

General Electric Announces

2 New Simplified Demand Registers . .



. . will help you save money by decreasing maintenance costs

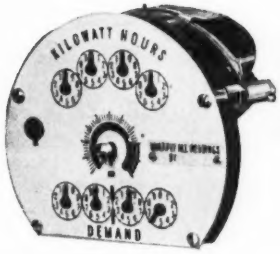
M-30 indicating demand register

This is a block-interval type of demand meter embodied within a register. It is available to replace the standard kilowatthour registers on a large variety of a-c watthour meters.* It integrates kilowatthours and gives the maximum demand during each reading period.

Your maintenance costs will be low because the timing motor, through a novel application of the Geneva mechanism, resets the pointer-pusher by direct-drive gearing, thereby eliminating the need for the spring and latch mechanism found in conventional demand registers. Internal resetting is accomplished with precision and freedom from shock.

Liberal spacing of plates, shafts, and gears gives maximum visibility for inspection. Very substantial plates, plus parallel arrangement of shafts, insure perfect alignment of parts and stability of bearings with minimum adjustments.

A wide, flat pointer with knife edge combines visibility and precision reading with minimum parallax.



M-31 cumulative demand register

This block-interval demand register (of the same basic construction as the M-30) indicates maximum demand during the reading period (usually one month) as well as the cumulated value of previous maximum demands. It has the advantage of leaving maximum demand for one period available for reference during the entire following reading period.

THESE REGISTERS lend themselves admirably to standardization and stock simplification. Also, you're assured of easier inspection and testing because of the fewer parts, interchangeable register timing motors (120- and 240-volt), and over-all simplification.

Let these features start saving money for you. Place an order with your nearest G-E representative today.

**Complete details on the M-30 in Bulletin GEC-413, M-31 in Bulletin GEC-272. Write for your copies now.*

Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

001-43

PACIFIC ELECTRIC

BREAKERS

69 kv, Type JE-42

Extra-Fast Fault Interruption and Reclosures

by Motor Compressed Spring Stored Energy Operating Mechanism

Type JE-42E
69 kv 600 amps
1,000,000 interrupting kva

Type JE-42F
69 kv 1200 amps
1,500,000 interrupting kva

Generously meet the requirements of modern practice in high-speed relaying

Motor-Compressed-Spring Operating Mechanism assures high-speed dependable opening and closing, either automatic or manual; ideal for synchronizing.

High-Velocity Gas Blast, directed into the arc stream, rapidly extinguishes the arc within Pacific Electric Expulsion Chambers.

High-Speed Tripping, for opening and closing, minimizes dead time.

Low Operating Current, d-c or a-c, reduces or eliminates battery or rectifier expense.

Easy to Inspect and Maintain—Low upkeep even when fault interruptions are abnormally frequent.

Shipped Assembled—Fully tested and adjusted at the factory.

Fully Conform to AIEE and NEMA Adopted Standards

Get All Facts . . .

Call

PACIFIC ELECTRIC MFG. CORPORATION

5815 THIRD STREET, SAN FRANCISCO 24, CALIFORNIA • P. O. BOX 419, GARY, INDIANA

LEONARD M. SLUSSER · C. H. CUTTER · C. C. MILGROVE · G. B. KIRKWOOD · PIERCE G. FREDERICKS · J. E. REDMOND CO.
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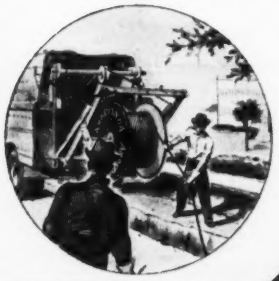
Denver, Colo. · Salt Lake City, Utah · Portland, Ore. · Butte, Mont. · Billings, Mont.

Other Representatives in Principal Cities

Durasheath



UNDERGROUND

IN CONDUIT

IN THE AIR

YOU'LL FIND IT *Everywhere*

Versatility is one of the big advantages of Durasheath cable. You will find Durasheath used for power distribution between farm buildings, in street lighting systems, airports, mines, industrial plants, railroad signal systems and real estate developments. You will often find a single length of Durasheath in runs that are partly in conduit, directly in the ground and in the air.

For simplified, safer and more dependable power distribution systems, pick Anaconda's Durasheath—available in single and multi-conductor cables, to carry from 0 to 5,000 volts.

ADVANTAGES IN DURASHEATH:

No problems of electrolysis, corrosion and extremes in temperature.

Reduced weight. Can be used on short aerial spans without a messenger.

High resistance to abrasion, cutting, impact and flame.

Greater flexibility makes handling easier.

Resistance to oils, moisture, acids and alkalies generally found in the soil.

49116

ANACONDA
from mine to consumer

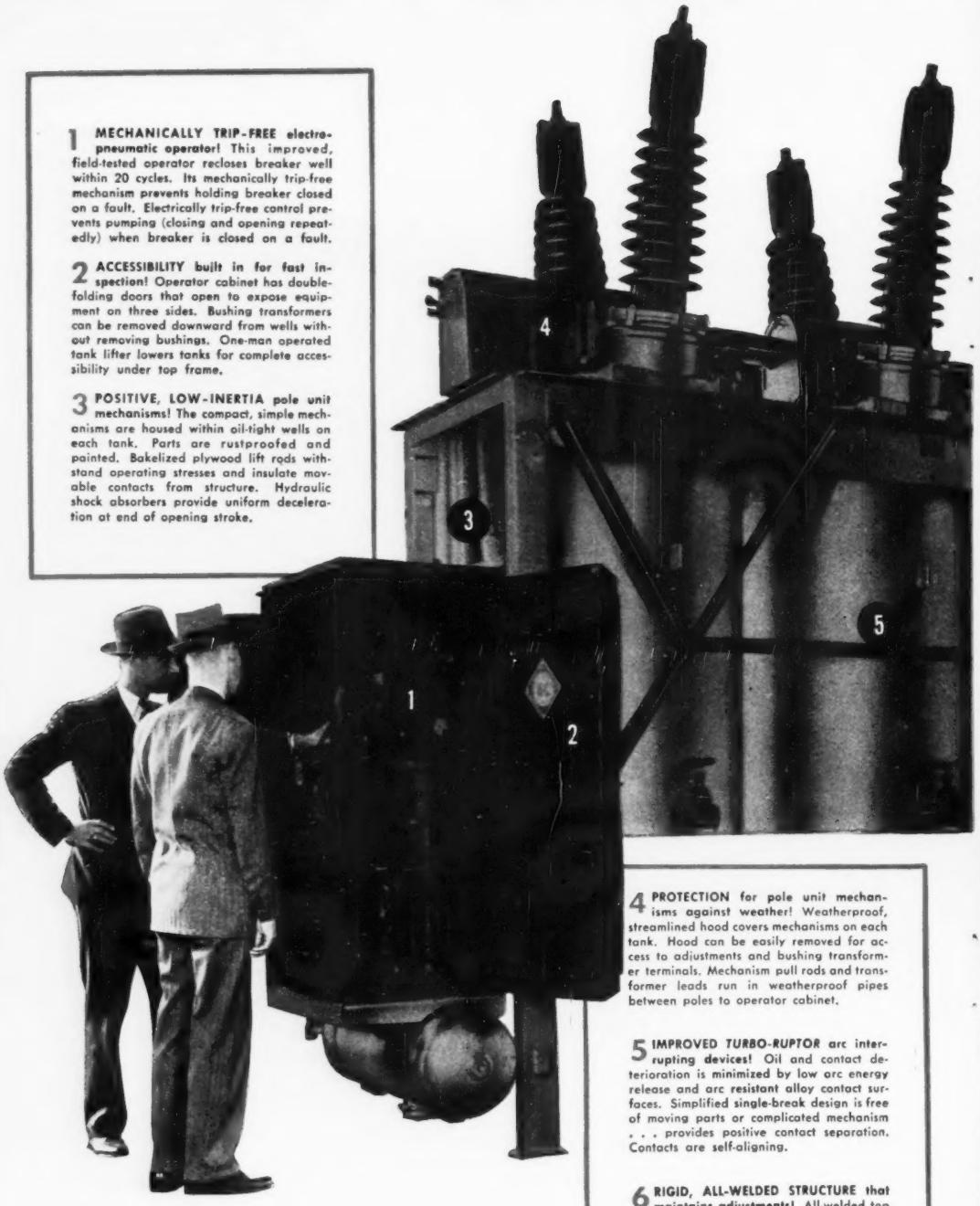
ANACONDA WIRE & CABLE COMPANY

25 Broadway, New York 4, N. Y.

1 MECHANICALLY TRIP-FREE electro-pneumatic operator! This improved, field-tested operator recloses breaker well within 20 cycles. Its mechanically trip-free mechanism prevents holding breaker closed on a fault. Electrically trip-free control prevents pumping (closing and opening repeatedly) when breaker is closed on a fault.

2 ACCESSIBILITY built in for fast inspection! Operator cabinet has double-folding doors that open to expose equipment on three sides. Bushing transformers can be removed downward from wells without removing bushings. One-man operated tank lifter lowers tanks for complete accessibility under top frame.

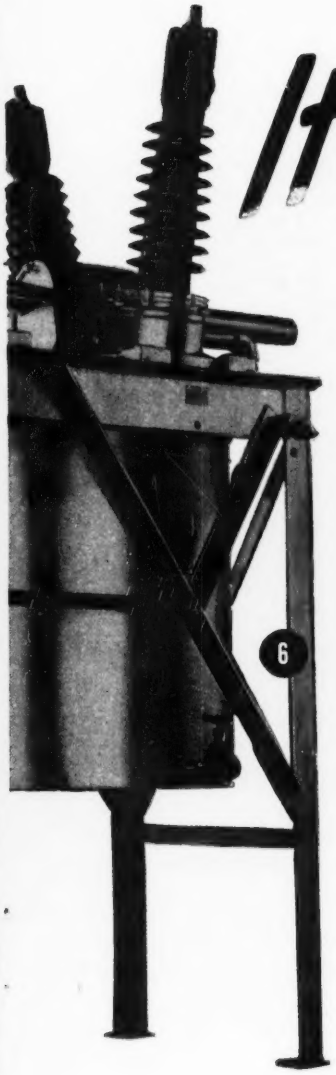
3 POSITIVE, LOW-INERTIA pole unit mechanisms! The compact, simple mechanisms are housed within oil-tight wells on each tank. Parts are rustproofed and painted. Bakelized plywood lift rods withstand operating stresses and insulate movable contacts from structure. Hydraulic shock absorbers provide uniform deceleration at end of opening stroke.



4 PROTECTION for pole unit mechanisms against weather! Weatherproof, streamlined hood covers mechanisms on each tank. Hood can be easily removed for access to adjustments and bushing transformer terminals. Mechanism pull rods and transformer leads run in weatherproof pipes between poles to operator cabinet.

5 IMPROVED *TURBO-RUPTOR* arc interrupting devices! Oil and contact deterioration is minimized by low arc energy release and arc resistant alloy contact surfaces. Simplified single-break design is free of moving parts or complicated mechanism . . . provides positive contact separation. Contacts are self-aligning.

6 RIGID, ALL-WELDED STRUCTURE that maintains adjustments! All-welded top frame supporting entire pole unit is welded to structural frame to form a rigid assembly. Exterior design eliminates corrosion-inviting crevices. Entire breaker is protected by three coats of weatherproof paint.



It's Completely Up-to-Date!

THE NEW ALLIS-CHALMERS FZO-151 OIL CIRCUIT BREAKER

RATED 69 KV: UP TO 3,500,000 KVA — WITH INTERRUPTION IN 8 OR 5 CYCLES . . . FAST RECLOSING WITHIN 20 CYCLES!

LOOK AT SIX of its many important features at left! *All* help you get modern breaker performance — help you save time and money on maintenance.

They include the *mechanically trip-free* electro-pneumatic operator . . . low-inertia pole unit mechanisms . . . and *Turbo-Ruptor* arc interrupting devices. Each is built for long, dependable service.

Talk to your nearby Allis-Chalmers representative about the FZO-151 circuit breaker . . . other Allis-Chalmers 69 kv breakers with 8- or 5-cycle interruption . . . and your other breaker needs, indoor or outdoor, in standard ASA ratings. Or write direct.

Turbo-Ruptor is an Allis-Chalmers trademark.

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MILWAUKEE, WIS.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

A 2561

...smoothly
...swiftly
...securely

Versatile Trucks

From Graybar you can get performance-proved FWD trucks, equipped as you wish for any line construction or maintenance job — with digger, derrick, or winch. Your choice of body styles and sizes. Trailers and dinkies also are a part of Graybar's full-range line.

TIME-SAVING TOOLS

Graybar has all the specialized tools you need to speed pole-line jobs. You can't do better than the Leach "Oshkosh" line of shovels, spoons, peavies, pikes, tampers. Simplex pole jacks, "American" Manila rope, and Coffing hoists are popular items, too. Also, tree trimmers, saws, shears.

"pliers to pockets"

All the smaller hand tools your linemen need are stocked by Graybar, too. Klein's pliers (all types), wrenches, grips, sleeve clamps, knives, safety straps, and combination tool pockets are linemen's favorites. Everything to make and keep your lines secure!

Local Deliveries

Many pole-line tools (including special types for hot-line work) and complete safety equipment are available from Graybar warehouses in almost a hundred cities. Whatever your pole-line requirements, the near-by Graybar Representative very likely can save you time in getting them together — and he'll make sure they're delivered when and where they're needed. A Graybar Outside Construction Specialist can help you solve any problem "from the bottom of the hole to the top of the pole". 4834

Everything for your pole lines
Via GraybaR

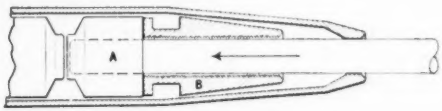
IN NEARLY 100 PRINCIPAL CITIES

HERE'S BIG NEWS IN SPLICING

BURNDY SPLICIT with POSITIVE INITIAL GRIP!

A. The Positive Initial Grip

B. Full-Tension Gripping Jaw



Now two grips instead of one . . . the Positive Initial Grip and the Full Tension Gripping Jaw.

The Positive Initial Grip acts like a "head" on the wire . . . holding it initially until tension is applied. This Positive Initial Grip alone withstands a tension in excess of 100 lbs. The wire cannot be twisted out of the Positive Initial Grip, for it turns freely with the wire.

The Full Tension Gripping Jaw takes over as tension is applied, permanently gripping the wire for the full length of the jaw and thus developing and maintaining the full holding power. A *Positive Splice* every time.

Size for size the Splicit is smaller, lighter, more compact . . . fully enclosed against weather attack and dirt or grit.

You'll like the new SPLICIT. Samples may be obtained through your local Burndy representative or direct. Available in sizes for Nos. 6, 4, and 2 solid. Other sizes to follow.

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Makes A Complete Line of

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CRESCORD . *Jacketed Portable Cord*

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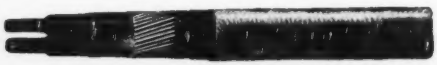

Service Cable - Types SE-U; SE-A; SD

CRESFLEX *Non-Metallic Sheathed Cable*

A B C *Armored Cable*

Distributed by principal electrical wholesalers throughout the United States. Their trained personnel and stocks are available to service your needs.

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WIRE and CABLE

CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

EVEN THE PAINT IS ENGINEERED TO CUT YOUR COSTS!

For more than a year, now, G-E Spirakore* transformers have all been newly dressed! They carry a new type of paint. And extensive laboratory tests show that this paint possesses marked improvement in weather durability . . . more resistance to water absorption . . . better gloss and color retention . . . increased resistance to abrasion . . . important qualities that mean lower maintenance costs for you. And while, of course, we have had no reports from users on repainting, we do know that this new high-quality paint is suitable for effective application in the field.

The new finish involves two baked-on coats: a prime coat and a finish coat of melamine-modified Glyptal, a superior synthetic resin paint.

ONE OF MANY IMPROVEMENTS

In addition, you get Spirakore design in all single-phase ratings—for greater savings in size and weight. You get improved impulse strength. You get sealed tank construction—for greatly prolonged oil life. And you get improved accessibility even with the complete sealing.

SPIRAKORE STILL LEADS

Today as ten years ago when lighter, smaller Spirakore transformers made history, Spirakore still leads the field. It's the finest distribution transformer we have ever made, the finest you can buy. Ask for Bulletins GEA-4885 and GEA-4521. *Apparatus Department, General Electric Company, Schenectady 5, New York.*

*Reg. U.S. Pat. Off.

Spirakore Transformers

GENERAL ELECTRIC

402-90

A wedge is a wedge is a wedge...

... or is it?

THE answer is "NO" unless you use Inmanco Hard Maple Wood Wedges — accurate in shape and size, straight grain to give maximum mechanical strength without slivers, splinters or fractures in normal assembly operations.

Unless otherwise specified, Inmanco Wood Wedges are tumbled and paraffined to resist moisture and make assembly easy.

Inmanco Wood Wedges can be made to your specifications either in standard 30" lengths or special cut lengths.

Wedgie says:

"With 48 standard sizes in stock and over 250 special sizes in ten different styles, I can give you not only 'the new look' in wood wedges, but also a perfect fit."

WRITE FOR FREE DESCRIPTIVE BULLETIN AND SAMPLE CARD

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SEATTLE, WASH.
Electrical Specialty Company
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800 ohms / cmf

Temp. Coeff. of Resistance:
± 0.00002 max. from −50°c to +100°c

Karma

the improved electrical resistance alloy!

Higher Ohmage makes possible Smaller Resistors—Increased Savings

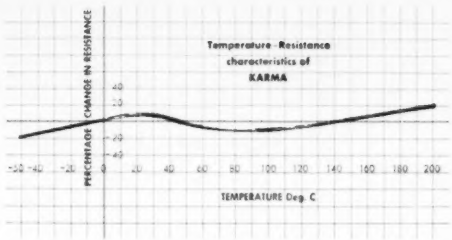
Compared with Manganin and Constantan (Advance*), the copper-base alloys widely used for high accuracy wire-wound resistors, the electrical resistivity of Karma* is exceptional — 800 ohms per circular mil foot, at 20°C, it is more than 2.7 times greater. Now you can wind even smaller precision resistors at still lower cost per ohm.

More Stable Resistance permits Wider Applications—at Wider Temperature Ranges

The comparably Low Temperature Coefficient of Resistance of Karma remains constant over a very much wider temperature range than that of Manganin or Constantan (Advance*). The "useful range" of Karma is more than 8 times that of Manganin and 4 times that of Constantan (Advance*). Karma, therefore, is especially adapted for service in precision resistors that are subjected to severe changes in temperature.

Low Thermal EMF Value against Copper assures Extreme Accuracy

In cases where error due to voltage generated by thermal EMF against copper must be confined to negligible proportions, Manganin has long been accepted as ideal for resistor windings. The thermal EMF value for Karma against copper is equal to that of Manganin itself!



High Resistance to Oxidation prolongs Electrical Properties

The superior surface oxidation resistance of Karma, essentially a nickel chromium alloy, enables it to retain its fine electrical properties longer than the copper-base alloys Manganin and Constantan (Advance*).

Higher Tensile Strength permits Faster Winding Speeds — saves Production Time

In addition to its outstanding electrical qualities, Karma affords physical advantages over the commonly accepted alloys. Its higher tensile strength permits faster winding speeds; its lower thermal expansion minimizes distortion and movement in windings.

In a word, this urgently needed Driver-Harris alloy offers *plus values all along the line*. Ask us about it. We shall be glad to supply you with complete data.

50TH YEAR · SPECIAL PURPOSE ALLOYS SINCE 1899 · D/H · TRADE MARK REG. U.S. PAT. OFF. · 1899 - 1949

KARMA* is manufactured only by

Driver-Harris Company

Western Representative: **ANGUS-CAMPBELL, INC.**

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Main Office and Plant: HARRISON, NEW JERSEY

*T.M. Reg.U.S.Pat.Off. *Formerly D-H experimental alloy #331

6 Months Faster

on power transformers... when they're "RM listed"

Certain G-E power transformers, within the complete G-E line, have for a number of years been designated as "repetitive manufacture," or "RM" for short. These are standard transformers—that lend themselves to quantity production.

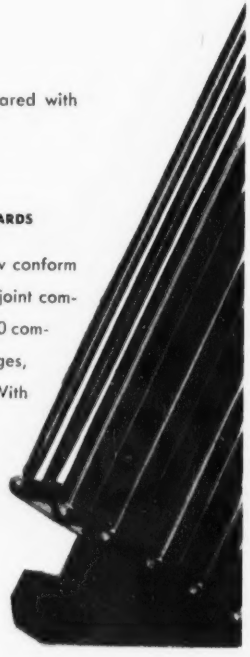
Because RM-listed transformers have standard E.E.I.-NEMA voltage ratings and the most popular kva ratings—and are available in standard designs, with only the most popular types and locations of accessories—much of the engineering and drafting for any particular order is already done. Likewise, many of the component parts can be mass-produced—and jigs and fixtures required in their building are already on hand—thereby cutting construction time.

As a result RM-listed transformers can be delivered sooner—anywhere from six to ten months sooner than specials.

For the same reasons, they can be built more economically—with the economies passed on to the purchaser in the form of lower prices, compared with non-RM transformers of identical ratings.

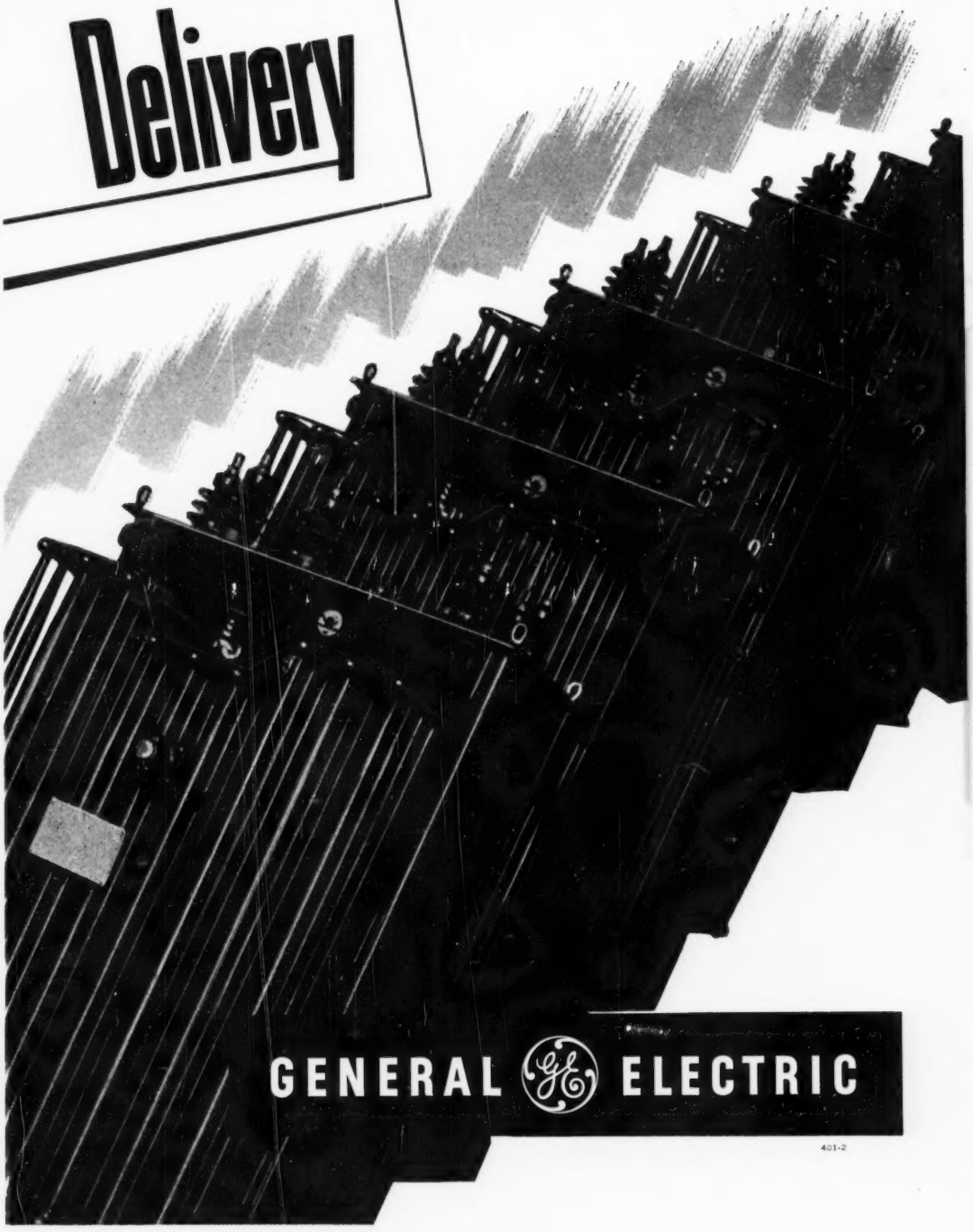
RM VOLTAGE RATINGS NOW CONFORM TO E.E.I.-NEMA STANDARDS

The voltage ratings of RM transformers now conform to the preferred ratings established by the joint committee of E.E.I. and NEMA. In all, nearly 3500 combinations of primary and secondary voltages, and kva's are available in RM designs. With four 2½-percent voltage taps standard, and with forced-air cooling as optional, these transformers are now suitable for even more widespread application.



Complete information on the latest listings of RM transformers is in the hands of our Apparatus Department Office nearest you. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

Delivery

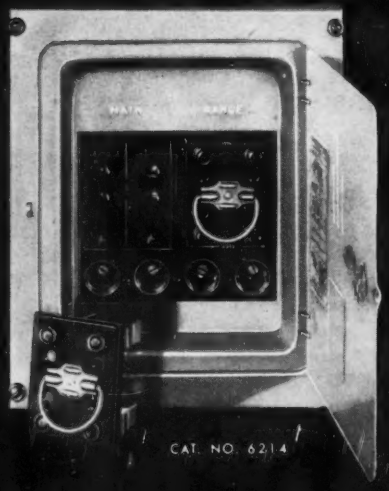


GENERAL ELECTRIC

401-2

The switch is to

GENERAL



ENCLOSED SAFETY SWITCHES • SERVICE ENTRANCE EQUIPMENT
BRANCH-CIRCUIT OR RESIDENCE PANELS • PANELBOARDS FOR
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MORE AND MORE Electrical Contractors Specify "GENERAL"

GENERAL
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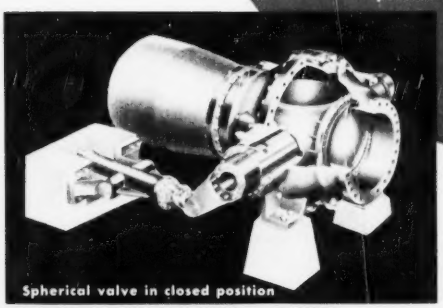
ALL OR NONE!

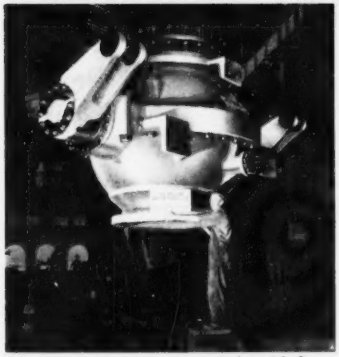
Unimpeded flow or positive closure with the new

PELTON SPHERICAL VALVE

Spherical valve in open position



Spherical valve in closed position



Spherical valve to operate at head of 1460 feet

PRINCIPLE OF OPERATION

SIZE RANGE: 6 in. to 72 in.
PRESSURE: 3000 feet, 1300 psi
TYPICAL USE:
High head turbine shut off valve
HEAD LOSS: Negligible
OPERATING MECHANISM:
Handwheel • Electric Motor • Hydraulic Cylinder

Developed primarily as a turbine inlet valve, the new Pelton Spherical Valve provides an uninterrupted flow passage when open and an exceptionally tight seating when closed.

For large, high head turbine installations where exceptional strength and tight closure are required, the Pelton Spherical Valve is unexcelled.

The low head loss through the clear circular passage makes the Pelton Spherical Valve particularly applicable to installations where the valve normally is fully open.

Compact design, with no moving parts within the valve, by-pass valves to equalize pressure, and renewable valve seats result in simpler operation and reduced maintenance.

The Pelton Spherical Valve is constructed of two semi-spherical steel body castings, a steel plug mounted in bronze bushings which contains the passage for water flow, and valve seats of spherical contour. Lever arms attached to one or both ends of the valve shaft may be geared to a reversible electric motor with limit switches set to open the power circuit at either end of the valve stroke, or may be operated by hydraulic cylinders using oil or penstock water as the hydraulic medium.

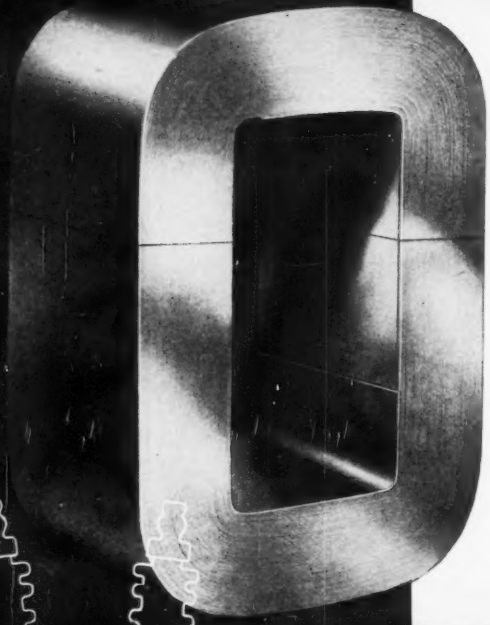
BLW THE BALDWIN GROUP

The PELTON WATER WHEEL Company

A Subsidiary of the Baldwin Locomotive Works

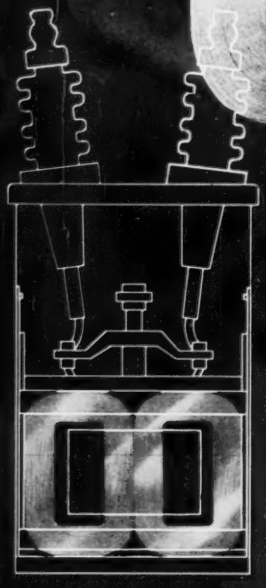
2929 NINETEENTH STREET • SAN FRANCISCO 10, CALIFORNIA

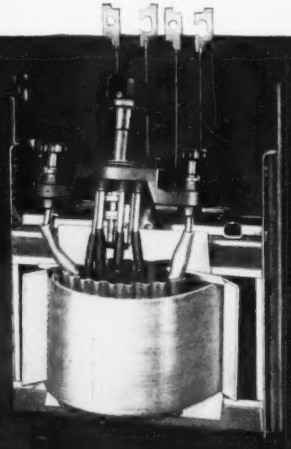
THE *NEW* MOLONEY



The new Moloney HiperCore Distribution Transformers incorporate advanced engineering practices and simplicity of construction, plus the usual Moloney high factor of safety in design. Cores are wound of high permeability, oriented, silicon steel having 30% to 35% greater flux carrying capacity than hot rolled steel. This makes it possible to decrease the amount of steel, copper and other materials, and at the same time improve the operating characteristics.

HiperCore Transformers with wound cores, are lighter in weight and smaller in size than transformers having cores of non-oriented steel. They have greater short-time overload capacity and provide better voltage regulation. Simple construction, together with low winding temperature gradient, results in trouble-free operation and longer life under all loading conditions. HiperCore Transformers are made in sizes 50 Kva and smaller, in voltage classes 15 Kv and below. Available in both Conventional and CSP Type of single-phase transformer.





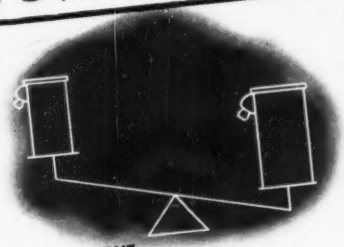
HiperCore*

SILICON STEEL

DISTRIBUTION TRANSFORMERS

4 STAR FEATURES

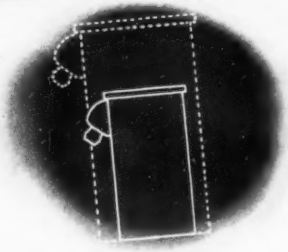
1



LIGHTER WEIGHT

The 30% to 35% higher flux carrying capacity of the oriented core steel used in HiperCore Transformers makes possible the use of smaller cores and windings, with consequent reductions in the weights of steel, copper, oil, and other materials. HiperCore Transformers weigh 15% to 30% less than transformers having cores made of hot rolled steel, making them easier to handle and install.

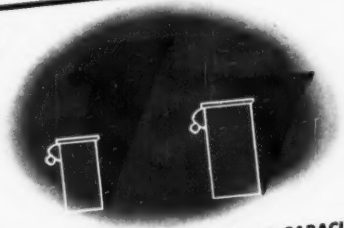
2



SMALLER SIZE

Since the higher flux carrying capacity of oriented steel permits the use of smaller cores and windings, smaller tanks can be used. Reductions in size range up to 30%. HiperCore Transformers take up less space on the pole, in the storeroom, and on the line truck.

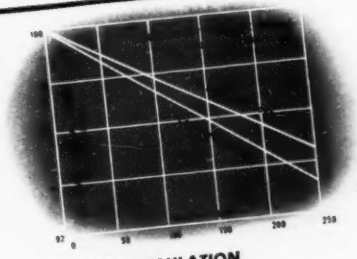
3



GREATER SHORT-TIME OVERLOAD CAPACITY

Moloney HiperCore Transformers have improved short-time overload characteristics which provide better peak load performance and longer life. Reduced coil mass, achieved through use of oriented steel cores, together with the extensive use of cooling ducts, results in more rapid cooling of the windings and in a lower hottest-spot temperature gradient.

4



BETTER VOLTAGE REGULATION

The smaller cores of HiperCore Transformers make possible windings having lower impedance. Lower impedance provides lower internal voltage drop at all loads. This is especially important during peak load periods, since HiperCore Transformers can carry higher overloads than older types, at the same permissible regulation.

MOLONEY ELECTRIC CO.

Power and Distribution Transformers Exclusively Since 1896

FACTORIES AT ST. LOUIS 20, MISSOURI AND TORONTO, ONTARIO, CANADA

TEMFLEX 105

flexible plastic tubing

Identify it by the name strip

High heat stops most plastic tubings, but not TEMFLEX 105 — TEMFLEX 105 defies heat . . . works continuously at extreme temperatures . . . as high as 105° C!

And TEMFLEX 105 retains the remarkable properties you have found in former Irvington plastic tubings — right up through those top temperatures.

TEMFLEX 105 passed Underwriters' Laboratories tests, yes — and more. In our own laboratories, we ran further gruelling tests — demanding unusual flexibility, high dielectric strength and strong oil resistance . . . after aging *longer*, at temperatures *higher*, than U.L. requirements.

Try TEMFLEX 105 for yourself where "hot spots" in your equipment have given you trouble. A special name strip running the length of the tubing distinguishes TEMFLEX 105 from tubings limited to lower temperatures.

Generous samples and full data are yours for the asking. Send for them.

IRVINGTON

VARNISH & INSULATOR COMPANY

Irvington 11, New Jersey

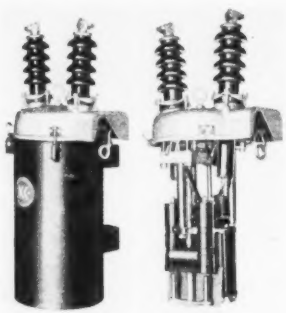
Represented in the Western States by
C. D. La Moree, Los Angeles, Berkeley, Seattle; Electric Motor Supply Co., Denver

PRODUCT NEWS

Recloser (200)

The new Kyle type L heavy-duty oil circuit recloser has a newly developed arc interruption arrangement; was designed for use on primary lines with load currents of 25 to 100 amp. for protection against fault currents up to 4,000 amp. Two independently housed contacts are employed to give two breaks in series. In this manner two arcs are drawn, one creating gas pressure which surges through the cross-blast chamber across the other arc, thus extinguishing it. In operation, the recloser is completely automatic, will reclose three times on a permanent line fault before locking out. If the fault is of a temporary nature, the recloser will clear itself on the first, second or third operation and automatically reset itself for another protective cycle.

The available operating sequences are two fast, two retarded operations; four fast operations; two fast, two extra retarded operations. These may be obtained by setting the time-selector plate or by the adjustment of a small part, the manufacturer states.



The series operating coil is designed to carry continuous current rating up to the tripping value without damage and for high-impulse strength. It is available in continuous current ratings of 25, 35, 50, 70 and 100 amp. for tripping currents of 50, 70, 100, 150 and 200 amp. respectively.

Castable Refractories (201)

Johns-Manville has announced development of two new castable refractories for service temperatures up to 3,000° F. They are 3X Firecrete and 3X Blazecrete. According to the manufacturer, use of these fast air-hardening refractories offers substantial savings in furnace construction costs because of their adaptability for application by casting, gunning and troweling.

Temperature Tester (202)

G-E has a portable oven-temperature tester for checking performance and efficiency of heating appliances. Designed as type DO-50, the instrument is a sensitive d-c millivoltmeter calibrated for use with iron-copnic (constantan) thermocouples having a resistance of 2.0 ohms.

High Interrupting Capacity at Low Cost...

with the NEW HC CUTOUT

PRESTITE PORCELAIN HOUSING—50-ampere, 5-kv—identical for both Type EA and Type HC cutouts.

MOLDARTA TYPE HC DOOR—High strength—high interrupting capacity—interchangeable with Type EA cutout door.

MOLDARTA TYPE EA DOOR—1,200-ampere interrupting capacity.

YOU CAN BE SURE... IF IT'S Westinghouse

To protect growing systems, the new HC cutout has interrupting capacities of 8,000 amperes at 2,500 volts (4,160 or 4,330 grounded Y), or 5,000 amperes at 5,000 volts (8,300 grounded Y). It is available in two designs, 50-ampere, 5-kv dropout and 50-ampere, 5-kv non-dropout. Doors alone are available for use in existing EA 50-ampere cutouts.

The new HC cutout provides all the advantages of the EA cutout. Doors are interchangeable in the Prestite porcelain housing. All re-fusing operations are done with complete safety by hookstick. A minimum of joints in the current path assures cool operation.

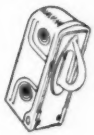
The new HC cutout is available now. For complete information, ask your nearby Westinghouse office or distributor for B-4299. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60686

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

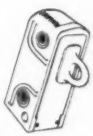
PROTECTIVE DEVICES FOR ANY SYSTEM

ONLY Westinghouse gives you this versatility in line protection



WHERE HIGH INTERRUPTING CAPACITY IS NEEDED NOW—install the new Westinghouse HC cutout—either dropout or non-dropout type.

WHERE LINE CAPACITY HAS OUTGROWN CUTOUT RATING—replace the EA cutout *door only* with dropout or non-dropout HC door.



WHERE NORMAL INTERRUPTING CAPACITY IS ADEQUATE—install Westinghouse EA cutouts with assurance that high capacity can be obtained easily and inexpensively when necessary.

Here's
a new handy
POCKET CATALOG,
Teammate

... planned especially for *you* to save you time and trouble. It's so small ... and yet so comprehensive ... you can carry it in your pocket when you go to a job and have all information at your fingertips.

This little pocket catalog includes the complete GUTH Line of *precision-planned* Lighting Equipment ... every detail you need ... all pre-digested into easy-to-find form for instant reference.

Your copy's waiting for you! Just write for Catalog 46 A-C.

YOUR TEAMMATE IN *precision-planned* LIGHTING

Guth LIGHTING

THE EDWIN F. GUTH COMPANY, ST. LOUIS 3, MISSOURI

Leaders in Lighting since 1902

651

Relay (203)

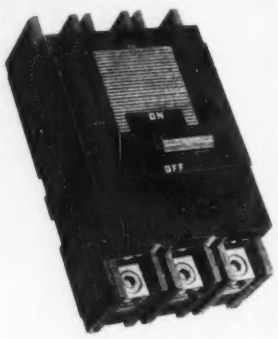
A switchgear differential relay operating from the voltage generated in the secondaries of standard bushing current transformers, instead of from the currents flowing in these secondaries, has been announced by G-E. According to the manufacturer, the new relay can be correctly applied by using simple arithmetical calculations. It is a high-speed device; is very sensitive to internal faults but insensitive to external faults. Therefore, any usual number of circuits can be accomodated with the new scheme and additional circuits may be added easily, it is stated. The relay is made up of simple, high-speed, plunger-type units which are readily adjustable, it is stated.

Interrupter Switch (204)

S & C Electric Co. has announced that the Alduti interrupter switch line, formerly manufactured in 7,500- and 15,000-volt ratings, has been extended to include 23,000- and 34,500-volt ratings. According to the manufacturer, the new higher-voltage switches are not merely projections from the lower-voltage units but are new developments, embodying new features tested in the field as well as the laboratory.

Circuit Interrupters (205)

Square D has announced circuit interrupters in cast iron enclosures, including weatherproof, dust-tight, dust-resisting and explosion-resisting types. Square D circuit interrupters are identical to corresponding circuit breakers but do not have thermal and magnetic trip features. They are designed for use in locations where space is limited and a local disconnect means is necessary.



Motor-Generator (206)

Kato Engineering Co. has developed a motor and generator assembly said to permit obtaining five or six different frequencies of a-c current simultaneously. The a-c motor runs at absolute synchronous speed; a silent chain is used to transmit power to each of the generator shafts and, by proper selection of gear ratios, each generator is driven at the necessary speed to secure the desired frequency.

Motor (207)

An explosion-proof, 1/200-hp. electric motor with r.p.m. rating of 5,000 to 20,000 under load and 10,000 to 40,000 free speed is offered by Mission Electric Mfg. Co.

This is General Electric's new secondary capacitor—3-kvar, 240-volts, single-phase—for pole mounting. It is approximately 40 per cent lower in price per kvar than similarly rated secondary capacitors heretofore available.

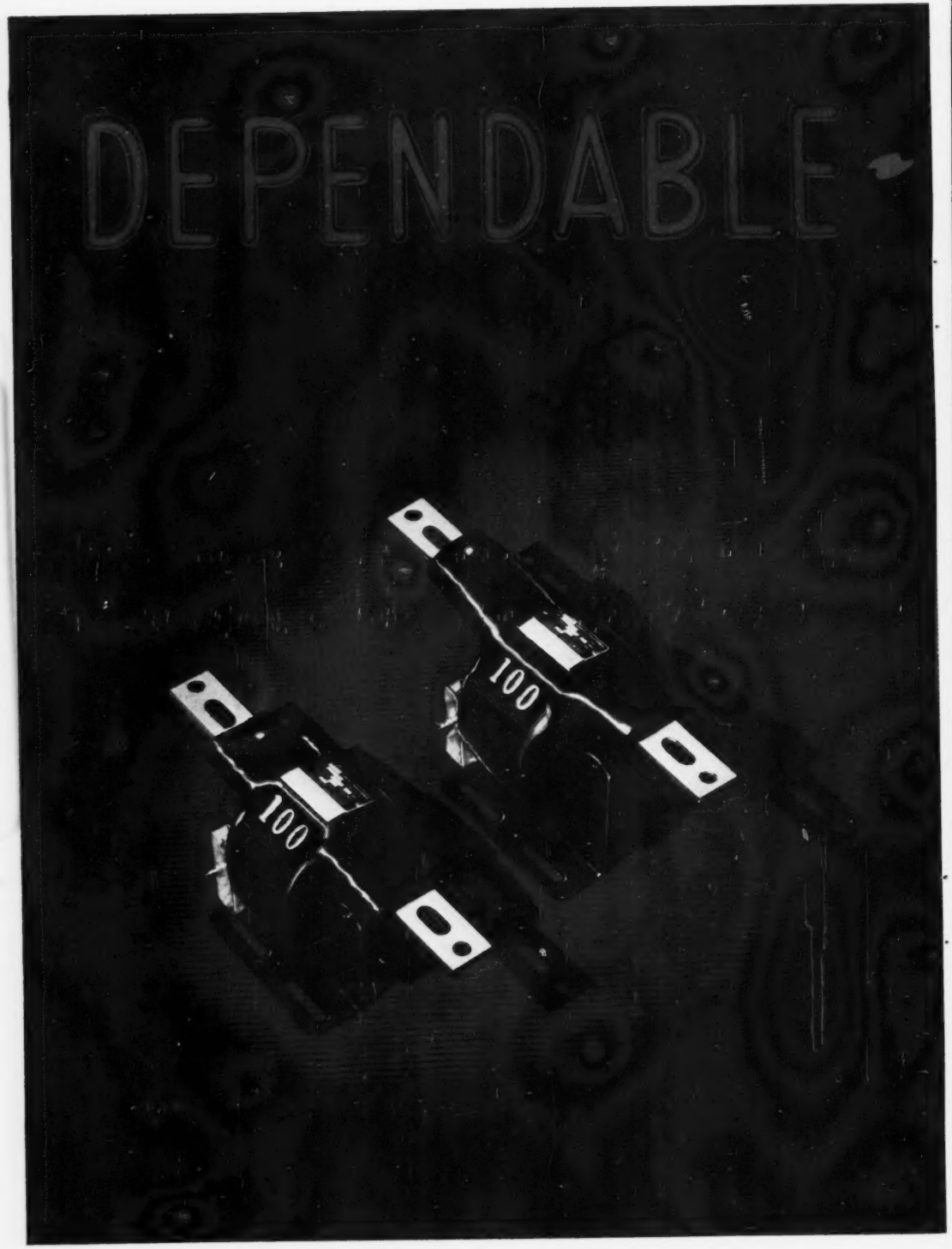
NEW! low-cost secondary capacitor

opens new fields in kvar generation

Secondary capacitors give the same benefits as primary capacitors for all the system, back to the generators, and in addition they decrease the voltage drop in the transformers and the secondary runs. Secondary capacitors will allow you to have more customers on each feeder, or existing customers can increase their load by 20 to 50 per cent for the same allowable voltage limits between the first and last customer with existing transformers.

Look into this new secondary capacitor for those load areas where either voltage drop or distribution transformer capacity is a problem. In many cases, it has proved most economical. We'd like to go over our calculations with you. Get in touch with your G-E representative, or write direct to *Apparatus Sales Divisions, General Electric Co., Pittsfield, Mass.*

GENERAL ELECTRIC


DEPENDABLE
100
100

Current Transformers

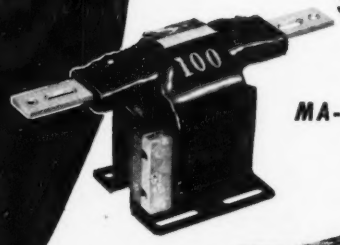
for your most accurate Metering Problems

The high accuracy and high impulse levels combined with low temperature rise of the new Sangamo Type MA Current Transformers mean thorough dependability. Liberally designed, and built to exacting Sangamo standards, these current transformers will provide high metering accuracy for indoor service applications.

Sangamo Type MA Current Transformers meet A. S. A. accuracy and impulse level specifications:

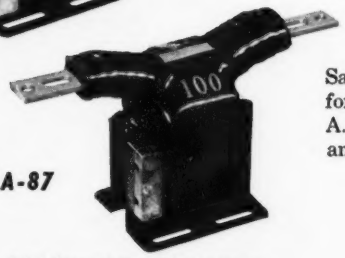
- A. S. A. impulse levels as specified for each voltage class.
- A. S. A. accuracy classification 0.3, B-0.1, B-0.2, B-0.5, B-2.0.
- Mounting dimensions in accordance with the newly proposed AEIC - EEI - NEMA specifications.

Sangamo Type MA Current Transformers



MA-50

Sangamo Type MA-50 current transformers are for circuits up to 5000 volts in accordance with A. S. A. 5 kv insulation class test requirements and best meter accuracy classification.



MA-87

Sangamo Type MA-87 current transformers are for circuits up to 8700 volts in accordance with A. S. A. 8.7 kv insulation class test requirements and best meter accuracy classification.

For full information on the construction of Sangamo Type MA current transformers, write for Bulletin 102. It will be sent without obligation.

SANGAMO

SANGAMO ELECTRIC COMPANY

SPRINGFIELD • ILLINOIS

SM486

Signed, Safe and Superior

IDEAL

It Costs You LESS to Use the BEST Wire Connectors

Wire-Nut®

Patented—No. 1,933,555
(THE SOLDERLESS, TAPELESS WIRE CONNECTORS)

Take a good look at this wire connector and the name it carries. The name "IDEAL" on a wire connector means these things—all of them important to you:

1. That the connector is a genuine IDEAL "Wire-Nut"—offering the fastest, easiest way known to make approved wire joints. Just screw on—like a nut on a bolt!

2. That, because of its unique design, it is the safest, strongest, most dependable wire connector you can buy . . . tested and proved-in-use by thousands of contractors and industrial plants for more than 20 years.

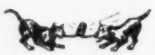
3. That from raw materials to finished product, it has been subject to the most rigid quality control . . . that it has been inspected and tested for material, components and uniformity no less than nine times. That's why the extra quality you get in "Wire-Nuts" never varies. In every 1,000 "Wire-Nuts" you can count on 1,000 perfect wire connections.

The pay-off comes, of course, in lower job costs for you—in better, safer wiring jobs.

See your IDEAL Distributor today or write for Wire-Nut Catalog WNC-947.

Only "WIRE-NUTS" Give You All These Advantages

EASIER TO USE. Just screw on—that's all! No solder, tape or tools.



RESISTS PULL-OUT. A "Wire-Nut" joint of two No. 14 wires will stand up to 176 pound pull.

DEPENDABLE. Not affected by vibration. Non-corrosive — resists abrasion.

SAFE. Wire ends fully insulated by strong moisture-resistant Bakelite shell that prevents "grounds" and "shorts".

TOP QUALITY Built to precision standards. Inspected and tested with laboratory care.

Circuit wiring with "Wire-Nuts" is simple because there are no tools to handle.

Two "Wire-Nuts" support entire weight of fixture. Joint is strong, permanent.

APPROVED. IDEAL "Wire-Nuts" are listed by Underwriters' Laboratories, Inc. and approved by other leading electrical authorities.

Electrical Contractors have used "Wire-Nuts" for over 20 years for circuit and fixture wiring. Millions in use.

IDEAL

IDEAL INDUSTRIES Inc., Sycamore, Illinois

Rheostatic Regulator (208)

Improved operating characteristics and increased applications for its Regohm rheostatic regulator are claimed by Electric Regulator Corp., following recent changes in construction of the unit. Improvements announced by the manufacturer include redesign of the magnetic circuit to give complete balance in all positions; use of new contact material to increase rating and life of contact fingers; availability of normally open or normally closed contacts; addition of a hermetically sealed enclosure.

Counter (209)

An electro-mechanical counter that can be stacked to six digits and is claimed to provide reliable carry over at an operating speed of 1,200 c.p.m. has been announced by Engineering Research Associates. Letters are 7/16 in. high. Control relays permit: electrical reset to zero in one-half second; alarm at end count; electrical read-out; independent input to any digit cell; subtotaling; self-testing.

Welding Control (210)

A single-phase to single-phase low-frequency electronic welding control with a lower kva. demand and a higher power factor than the standard single-phase to single-phase control has been announced by Westinghouse. It is said to make possible welding of scaly or rusty steel with a minimum of spitting from the electrodes and to weld brass or aluminum.

Pressure Indicator (211)

Automatic Temperature Control Co. is offering the Atcotran, a pressure indicator with three 72-in. scales. According to the manufacturer, three bands may be calibrated either linearly for any range required or in square root scale for flow, etc. Selection is made from switches on the case front. Each scale is said to move full range in less than two seconds.

Phase-Sequence Indicator (212)

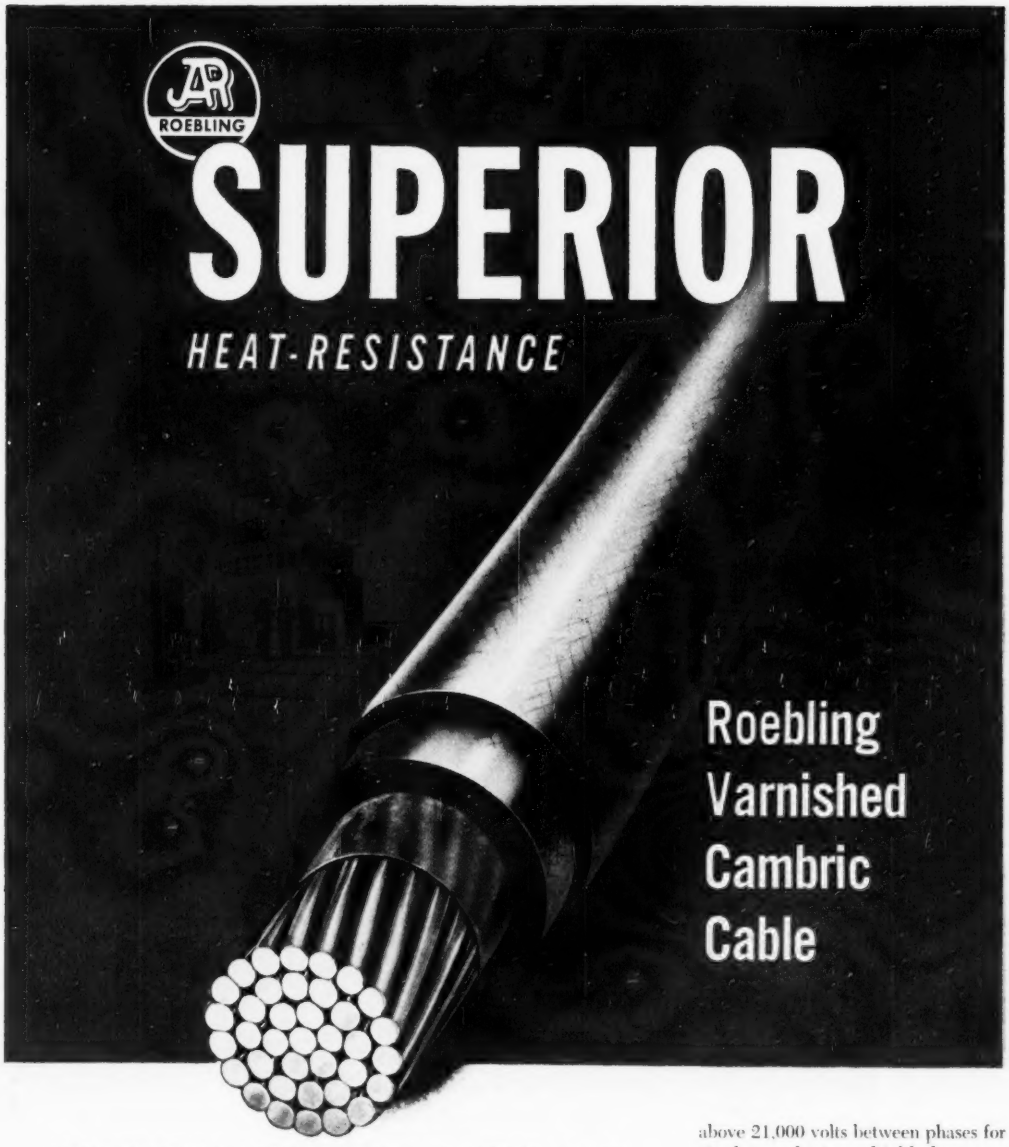
A phase-sequence indicator announced by General Electric is entirely static, with no moving parts, bearings or pivots; is applicable to either 120-, 240- or 480-volt circuits at 25, 50 and 60 cycles. It is housed in a leatherette-covered wooden case with a cover to protect the two type NE-51 standard neon lamps. Three 30-in. leads are an integral part of the instrument, have insulated clips for quick, easy operation.

Starters (213)

A line of a-c magnetic starters added by G-E is designed for starting and protecting motors up to 50 hp.; is furnished in all NEMA sizes from 0 through 3. The contactors can be furnished in NEMA sizes 00 through 3. The starters come either open or mounted in general-purpose, watertight, dusttight or hazardous-atmosphere enclosures.

Burglar Alarm (214)

A burglar alarm announced by Ripley uses a modulated light beam invisible to the naked eye; is not affected by surrounding light. According to the manufacturer, the light beam is effective over more than 250 ft. and can be sent around corners or crisscrossed.



BEST CHOICE for GENERATOR and MOTOR LEADS

FOR THE TORRID ZONES in power, heat and lighting circuits, Roebling Varnished Cambric Cable is your one best choice. The heat resistance of Varnished Cambric gives top efficiency on leads for generators, motors, transformers and oil switches.

You can have Roebling Varnished Cambric Cable in single or multiple conductor types . . . single, from 2,000,000 C. M. to No. 14 A.W.G. Both constructions are adapted for use not above 17,000 volts between phases for unshielded multiple conductor . . . not above 21,000 volts between phases for single conductor, shielded on ungrounded neutral . . . not above 28,000 volts between phases for single conductor, shielded on grounded neutral.

Write for detailed information, or contact with your Roebling Distributor—he'll be glad to help. John A. Roebling's Sons Co. of Calif.—San Francisco—Los Angeles—Seattle—Portland.

WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST ROEBLING OFFICE AND WAREHOUSE

Atlanta, 934 Avon Ave. ★ *Boston*, 51 Sleeper St. ★ *Chicago*, 5525 W. Roosevelt Rd. ★ *Cleveland*, 701 St. Clair Ave., N. E. ★ *Denver*, 1635 17th St. ★ *Houston*, 6216 Navigation Blvd. ★ *Los Angeles*, 216 S. Alameda St. ★ *New York*, 19 Rector St. ★ *Philadelphia*, 12 S. 12th St. ★ *Pittsburgh*, 855 W. North Ave. ★ *Portland, Ore.*, 1032 N. W. 14th Ave. ★ *San Francisco*, 1740 17th St. ★ *Seattle*, 900 First Ave.

ROEBLING

☆ *A CENTURY OF CONFIDENCE* ☆

. . . *TOP* QUALITY FROM BAKELITE BODY TO BINDING SCREWS, here are two leaders in the growing family of SLATER *LIFETIME* WIRING DEVICES.

The Slater designed, engineered and produced line of wiring devices has grown in two short years to more than *ten times* the number of items originally offered. Government specifications which read "Slater quality or equivalent" are no rarity even in that brief history. Virtually every requirement of the electrical contractor can be met by a Slater item.

Progress like that reflects the modern, fully equipped plant, the rigid tests to which every piece is put to simulate the most vigorous service conditions, the devotion of the Slater personnel to delivering the best possible product at the best price.

Illustrated are: At left the #400 series toggle switch. T rated, extra heavy duty 10AT-125V; 5A-250V. Preloaded, chatterless, extra heavy duty, damped vibration contacts, a new principle in contact design. Large heavy binding head screws. Ample wiring room. Totally encased bakelite body. Tested on 100 amp. tungsten inrush. Meets all Federal and REA specifications.

At right the #300 T slot extra heavy duty duplex receptacle, 15A-125V; 10A-250V. Strongest bakelite body construction, uniform preset contact pull. Lifetime service under hardest usage. Ample wiring space. Large head, stacked screws. Meets all Federal and REA specifications.

Write for literature on our ingenious new pull chain receptacle, oversize dust proof, unbreakable. And write for our complete catalogue. Address Dept. EW.

Slater
ELECTRIC & MFG. CO.
WOODSIDE, NEW YORK
Lifetime wiring devices

Grease Tester (215)

Ball-bearing grease testing equipment offered by G-E consists of tester and control box. The former is a small motor-driven unit with two bearings, one for testing and the other for a guide. A 500-watt heater, located between the bearings, simulates the source and flow paths of heat in an electric motor. The temperatures of the outer race of the bearings are measured by a pair of copper-copnic thermocouples. The control box consists of two thermostats and a panel on which are mounted a motor switch, a line switch, an actuation button and a time meter. The time meter, marked in tenths of hours, measures time on a cyclometer-type counter up to a period of one year.

Solenoid (216)

Soreng Mfg. Corp.'s TT-type solenoid is now supplied in a push-type unit. The stroke of the plunger is 1 1/16 in., with thrust varying from 4 to 12 lb. for an intermittent-duty unit and from 3 to 10 lb. for a constant-duty unit, 60 cycles. According to the announcement, these solenoids may be wound for any a-c voltage and brackets are available for either horizontal or vertical mounting.

Vibrometer (217)

A recording vibrometer that measures and records frequency, displacement and wave shape of mechanical vibration has been added to the G-E line. It is built to operate either when mounted on a fixed base or held in the hands; weighs 7 lb.; is less than 8 in. long. It was developed for all types of reciprocating and rotating machinery within a vibration frequency of 10 to 120 cycles per second.

Selenium Rectifiers (218)

A new line of selenium rectifiers covering the range from 2 volts and 150 milliamperes to 5,000 volts and 10,000 amp. has been developed by International Rectifier Corp. The individual plate sizes range from 1¼x1¼ in. to 6¼x7½ in. Plates are assembled in an interlocking arrangement between the plate and insulating sleeving so as to prevent possible plate rotation or lug misalignment, the announcement states.

Anchor (219)

S. A. Mfg. Co. has incorporated a dimpling operation in the new assembly of steel cap and threaded head of its expansion anchor. This action is said to prevent removal of the cap and loss prior to application. The head is entered first and the cap is then driven over the tapered head end. Six sizes range from 10-24 to ½ in. 13.

Fuse (220)

An Underwriters' approved 5-in-1 plug fuse has been announced by H-R Electric Co. Selection of new links for this 15-amp. fuse is by rotation of the outer glass shell. A bronze contact spring acts as both rachet and contact. The strong spring tension assures positive snap action, the manufacturer states.

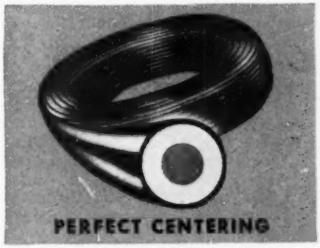
Furnace Control (221)

A single-unit furnace control that does double duty as air limit and fan control has been added to the Cam-Stat line. It weighs 12 oz., is 5⅜x2⅞x2¼ in. Listed by Underwriters' Laboratories.

"It's easier to pull ...it's Laytex RU"

Mr. USRUBBY, the Wire Engineer, knows what he's talking about. Electricians find that Laytex RU, with its special new wax finish, is surpassed by no other wire in ease of pulling and handling. To be exact, only 22 to 26 pounds pull was needed to pull Laytex RU through the test conduit shown at right—as compared with 32, 40, 42, 45 and 80 pounds, respectively, for 5 other leading brands. In other words, Laytex RU is 33% to 300% easier to pull!

Moreover, Laytex RU permits more wire per conduit on rewiring jobs because it is America's smallest diameter rubber covered branch circuit wire. United States Rubber Company's unique dip method applies 90% pure rubber to the conductors, eliminating the usual bulkiness and weight.



This special method also keeps the conductors perfectly centered in the insulation, preventing thin spots. But that isn't all. The physical and electrical properties of U. S. Laytex RU far exceed those of other building wires! In tensile strength, di-electric strength, insulation resistance, and elongation, LAYTEX RU is unsurpassed. The saturated cotton fibrous cover is flame-retardant and moisture-resistant. There is no finer building wire on the market.

U. S. Laytex RU carries the label of the Underwriters' Laboratories and is listed in the National Electrical Code as an all-purpose wire. Send today for a sample plus booklet containing more details about this wire. Write Wire and Cable Department, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

*Reg. U. S. Pat. Off.

A PRODUCT OF
U.S. RUBBER
SERVING THROUGH SCIENCE
UNITED STATES RUBBER COMPANY

RU wiring with **RU?**

650 Distributors for SPEEDY SERVICE!

Buckingham
LINEMAN'S SAFETY EQUIPMENT

In Buckingham's dictionary "SERVICE" is a by-word meaning:

1. 650 well-stocked distributors—each strategically located to serve you quickly and efficiently.

2. Constant product improvement—always designed to promote the safety and comfort of the lineman.

3. Production schedules geared to the increasing demand for Buckingham Equipment—assuring you on-time deliveries.

Buckingham experience dates back 50 years to the original Stephens Climbers—hallmark of quality in the utility field. Experienced craftsmanship like this is your guarantee of safe, durable and economical linemen's equipment.

Buckingham Standard Safety Strap No. 3042

Safe and dependable. Drop-forged, tested snaps and buckles. Buckle end reinforced with metal to increase strength and wear. Made from backs of best selected harness leather.

Buckingham Cushion Deluxe Floating Tool Belt No. 1058

Floating feature insures full tool loops under all conditions. No rivet heads or metal contact the body. Made of tan harness leather and lined with soft chrome lace leather.

Buckingham Adjustable Climbers No. 9205

Each climber can be adjusted from sizes 15 to 18½, providing exact fit. Replaceable gaffs eliminate discards due to blunted or broken gaffs. Tested for safety. Built-in features provide maximum comfort.

Other Buckingham Equipment

Famous Stephens Climbers
Right-and-Left Lightweight Climbers
Tree Climbers
Spur Protectors
Thread Cleaners
Tool Bags and Pouches
Industrial Safety Seats
Skinning Knives
"Protecto Grips"
Tree Surgeon's Web Belts and Saw Scabbards

SEE the complete line of Buckingham Equipment at your nearest supply house. Or write today for complete information.

BUCKINGHAM MANUFACTURING CO., INC.
5-7 Travis Street Binghamton, N. Y.

Indicating Voltmeter (222)

An indicating voltmeter with an expanded scale has been designed by G-E for general switchboard use by electric utilities and large industries. Scale is 7.1 in. long, spans 250° about the center; is expanded over the most frequently used range, from 90 to 130 volts, enabling easy detection and measurement of 0.5-volt variations within that range, the manufacturer states. Accuracy has been determined to within plus or minus ⅛% in the range of 105 to 125 volts and plus or minus 1% over the entire expanded range. Although available in only one rating, 0-90 to 130 volts, it can be supplied with scales applicable to potential transformers for higher voltages.

Temperature Log (223)

A new Speedomax instrument developed by Leeds & Northrup is claimed to automatically log as many as 160 separate thermocouple temperatures in succession at a rate of 4 seconds per point. In case of trouble, the operator can cut thermocouples out of the measuring sequence in banks of 20 at a time, until the instrument is concentrated on the particular group of temperatures in which he is interested at the moment, or he may set the instrument to record any single thermocouple or all points continuously.

In usual operation, this instrument indicates while numbered lights identify each couple. Should any temperature reach a preset limit, the device automatically starts its recording chart drive, begins to record all points as a series of numbered dots, operates an alarm.

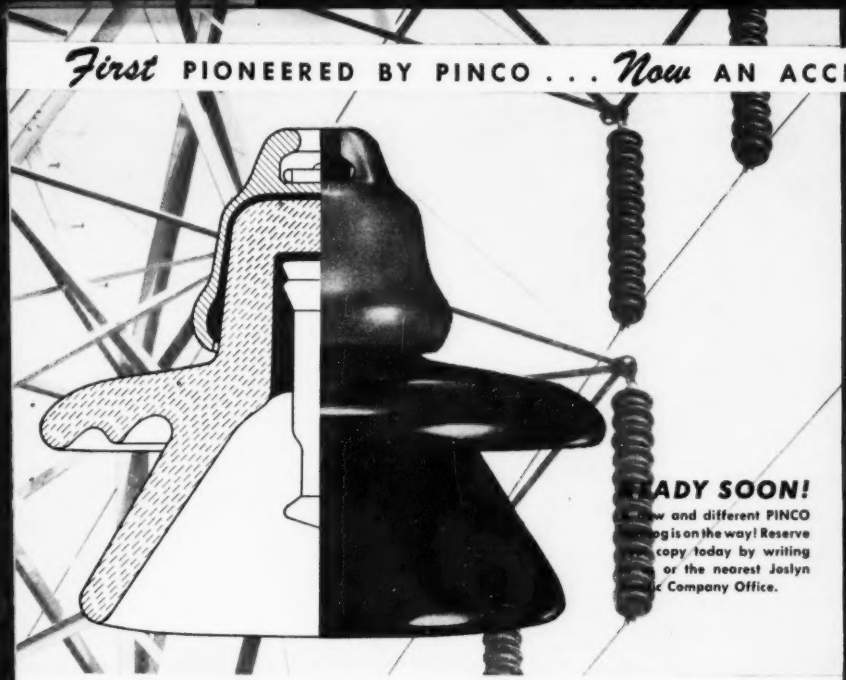
Tester (224)

International Instruments Inc. is offering the Miniature Multitester, a combination ohmmeter and voltmeter for testing resistances and a-c and d-c voltage frequencies. As an ohmmeter, the manufacturer claims the unit will test and indicate resistances from 0 to 2 million ohms, with an accuracy of plus or minus 2% of linear scale. In testing voltages, it registers d-c voltage from 0 to 300, with a claimed accuracy of plus or minus 2% at 10,000 ohms per volt. A-c voltage, registering from 0 to 10,000 ohms per volt, is stated to be accurate to within plus or minus 5%.

Clamps (225)

Marman Products Co. is making multipurpose clamps for use in servicing armatures and commutators. These clamps have been used to pull coils into place when rewinding armatures and to hold commutator segments while assembling and processing, the manufacturers states. It is designed for use in any situation where a wrap-around clamp action is required, according to the announcement, which also states that a large diametrical take-up range is provided and pressure may be released instantly by backing off locking screw one-half turn.

First PIONEERED BY PINCO . . . *Now* AN ACCEPTED STANDARD



…ADY SOON!
…w and different PINCO …og is on the way! Reserve … copy today by writing … or the nearest Joslyn …c Company Office.

Competitive Tests . . . Service Records Prove the Superiority of the PINCO "UNIVERSAL" INSULATOR NO. 1925

In competitive "fog operation" tests conducted by a Western power company, Pinco No. 1925 Insulators rated . . .

FIRST on "fog arc over."

FIRST on sustained voltage "in fog" . . . NO arc over.

FIRST on sustained voltage "in direct spray" . . . NO arc over.

FIRST on both self-cleaning and manual cleaning characteristics.

SECOND on "sluice arc over".

"EXCELLENT" on radio interference characteristics.

We're proud that Pinco Insulators were so conclusively proved "right" by such laboratory tests. But we're even prouder that in actual operation under "fog" conditions, thousands of Pinco No. 1925's, on installations made several years ago, are still giving absolutely trouble-free service . . . and are meeting their job requirements 100%. This proves they're "right" where it counts . . . "right *on the job!*" May we prove the superiority of the Pinco No. 1925 to *you*?

The Porcelain Insulator Corporation
769 Main Street • Lima, New York

Where excessive insulator contamination is an operational hazard . . .

The PINCO "Universal" Insulator No. 1925

excels because

- Leakage distance is 16½" (11" on standard designs)
- Petticoats are outside . . . shielded above by bell, below by hood
- Hood is long, tapered, self-cleaning; acts as spatter-baffle, to clean petticoats
- In strings, interior of hood is shielded by unit below. This lessens contamination, need for manual cleaning

PINCO PRODUCTS ARE WAREHOUSED AND DISTRIBUTED BY
JOSLYN PACIFIC COMPANY

PINCO INSULATORS

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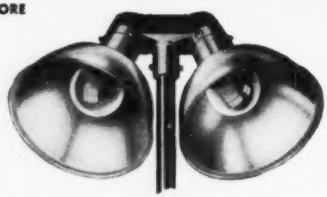
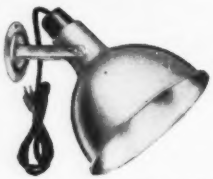


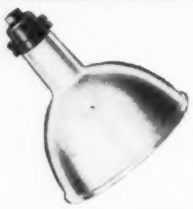
No. 808
Duplex-Lite, 9¼" Reflectors matte aluminum, for 200 watt lamps, complete.

No. 500
Holder for PAR-38 & R-40, 150 watt lamps (lamp not furnished).



No. 802
9¼" Reflector matte aluminum, for 150-200 watt lamps.

No. 1100
Yard-Lite, 14" Reflector matte aluminum, for 150 watt lamps.



No. 800-SC
9¼" Reflector matte aluminum, for 150-300 watt lamps.

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S & M LAMP CO.
119 WEST 36th PLACE • LOS ANGELES 54, CALIF.

Soldering Tool (226)

Ideal Industries has a light-duty Thermo-Grip soldering tool that operates on the resistance heating principle. Touching the work with the soldering tool completes the secondary power circuit and causes the part touched to heat almost instantly. A thumb switch permits close heat control. The unit draws current only when the soldering tool is in direct contact with the part to be soldered. Power unit and case measures 9½x6x8¾ in. including storage space for attachments; weighs 16 lb. Soldering heats are Hi-5.3 volts and 10-4.2 volts. Unit is equipped with on and off switch and pilot light to indicate when current is on.

Insulating Bushing (227)

O. Z. Electrical Mfg. Co. is offering an all-Bakelite insulating bushing, claimed to be of increased strength and durability. Rounded edges protect wire insulation during pulling and when in service, according to the manufacturer, and when the bushing is dropped it rebounds, does not crack. When desired, the bushings are furnished with caps which keep out plaster and other refuse until installation is completed. Size range is from ½ to 6 in. Underwriters' approved.

Plastic Tubing (228)

Irvington Varnish & Insulator Co. has announced a new plastic tubing approved by Underwriters' for continuous use at temperatures up to 105°C. and known as Temflex 105. According to the manufacturer, laboratory tests show very favorable results in regard to retained elongation, tensile strength, flexibility and dielectric strength after exposure to temperatures up to 150°C.

Preformed Rods (229)

Locke is offering a new line of preformed armor rods, pretwisted at the factory to fit any size and type of conductor. According to the announcement, the lineman lays the preformed armor strands across the conductor, gives a couple of twists by hand to complete the job. These rods are available in aluminum alloy, galvanized steel, bronze or copper.

Conduit Bushing (230)

The new Buchanan insulated metallic conduit bushing is claimed to provide absolute protection against abrasion of cable insulation and accidental grounds. These "Bush-ends" require no inside locknuts; are light weight and rugged, according to the manufacturer. All sizes Underwriters' approved.

Tubing (231)

Varglas Permafil tubing has a synthetic coating of General Electric Permafil. The coating is said to excell oleocresinous and other coatings in certain qualities and to meet electrical standards, sizings, wall thicknesses and diameter dimensionals of standard varnish tubings.

Preheater (232)

A new 3-kw. 40-megacycle preheater for plastic preforms offered by G-E operates on 230 volts, single phase, 60 cycles; will heat 40 oz. of wood-flour phenolic compound from 70 to 250°F in one minute, or 1 lb. in 24 seconds, according to the announcement.

"JOB PROVEN" THE WORLD OVER Nicopress

Illustration of No. 51 type Nicopress tool with P. & J. Grooves.

Completed splice on Solid Copper Conductor

Completed splice on Copperweld Conductor

Completed suspension deadend for Copper and Copperweld Conductors

Partially completed reinforcing sleeve on Copperweld

Nicopress sleeves and tools are available in a complete range of sizes for Copper, Copperweld-Copper, A. C. S. R. and Steel Conductors.

Nicopress

is the Registered Trade Mark of The National Telephone Supply Company

The National Telephone Supply Company

8100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

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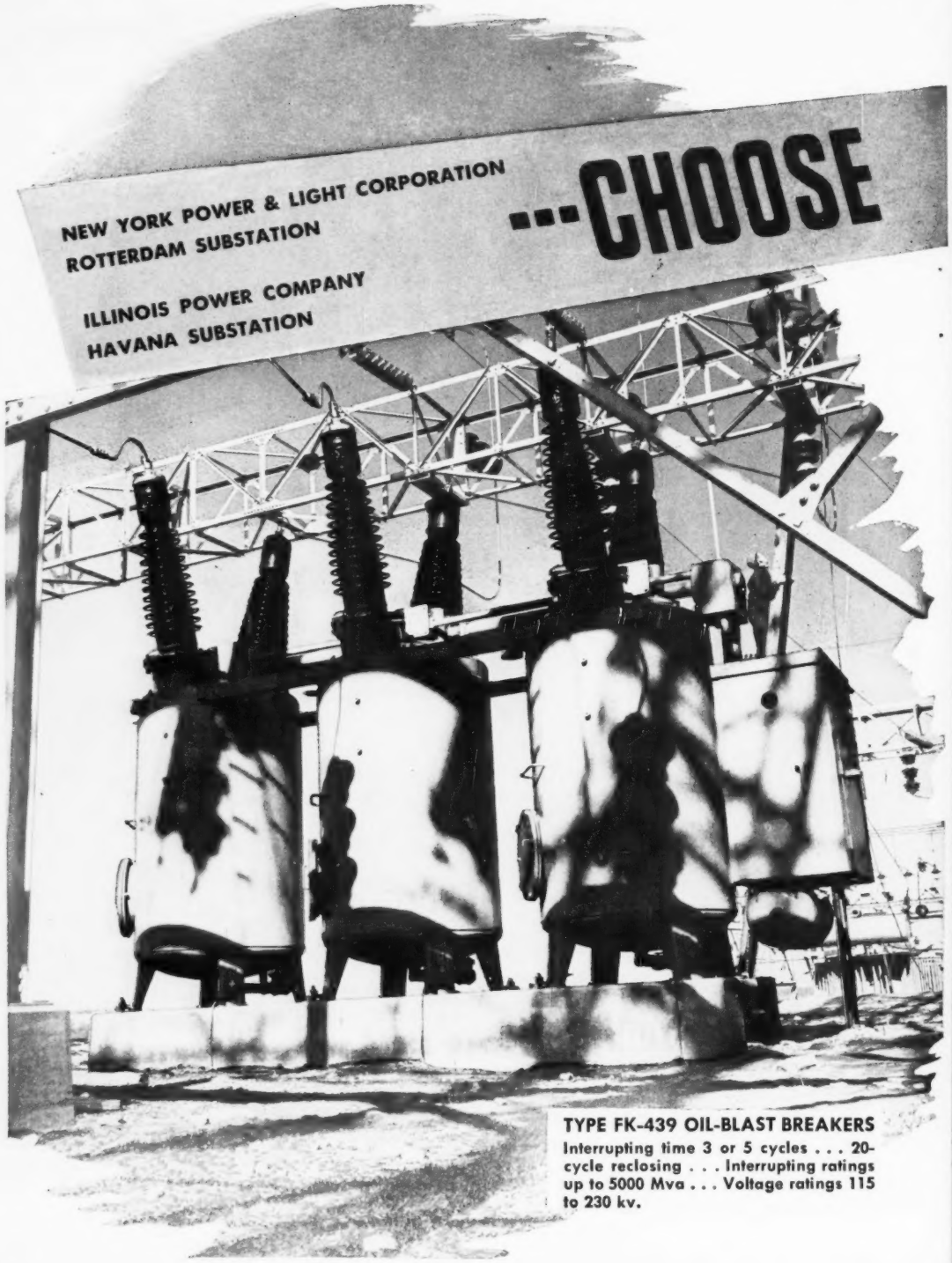
Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY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...CHOOSE
TYPE FK-439 OIL-BLAST BREAKERS
Interrupting time 3 or 5 cycles . . . 20-cycle reclosing . . . Interrupting ratings up to 5000 Mva . . . Voltage ratings 115 to 230 kv.

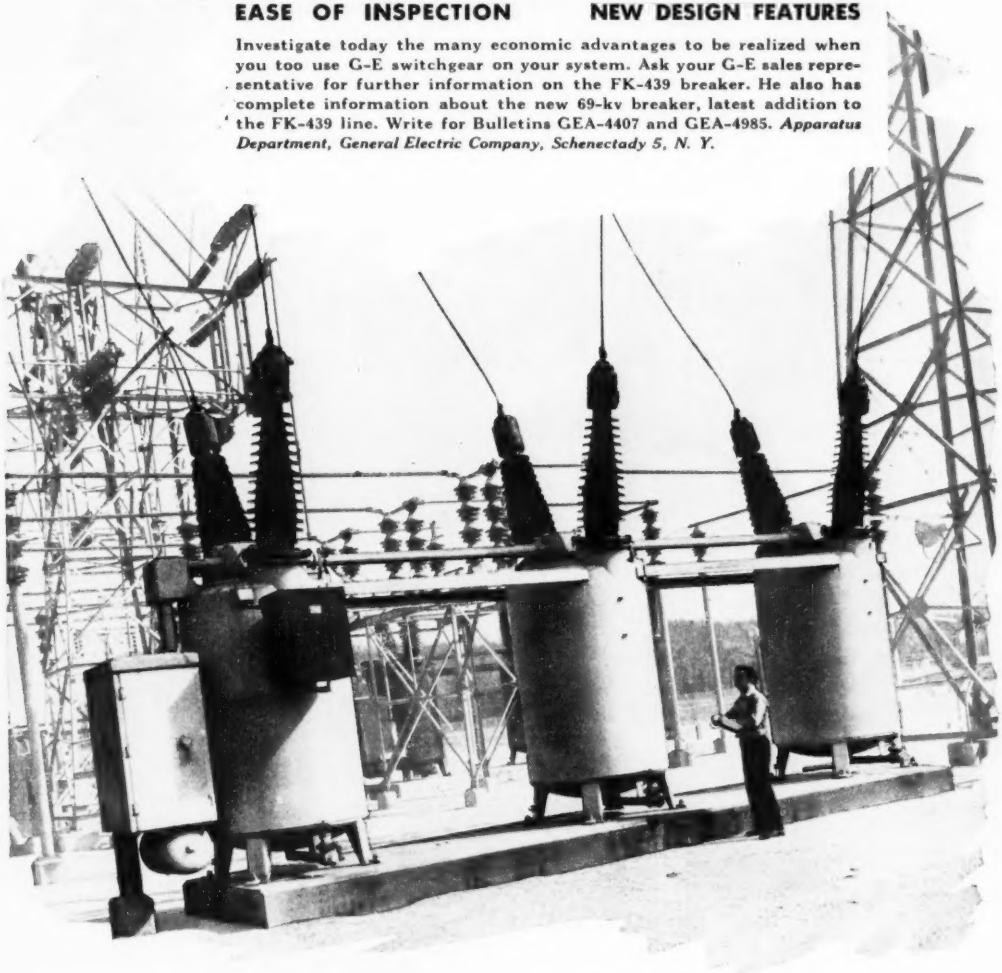
HIGH-VOLTAGE BREAKERS

FOR

20-CYCLE RECLOSING
NEW SEALED BUSHINGS
EASE OF INSPECTION

3 OR 5 CYCLE HIGH-SPEED INTERRUPTION
NEW DESIGN FEATURES

Investigate today the many economic advantages to be realized when you too use G-E switchgear on your system. Ask your G-E sales representative for further information on the FK-439 breaker. He also has complete information about the new 69-kv breaker, latest addition to the FK-439 line. Write for Bulletins GEA-4407 and GEA-4985. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*



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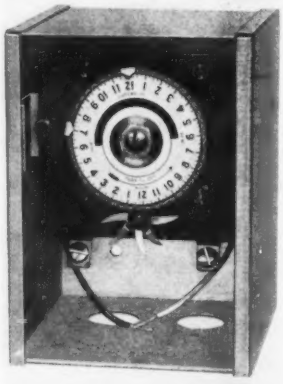
SALES OFFICES AND WAREHOUSES

SAN FRANCISCO LOS ANGELES
PORTLAND SEATTLE

Showcase Lighting (233)

Wiremold Co. has added a complete series of fluorescent showcase lighting units, using No. 2100 Wiremold in golden bronze finish. This 21AR series will be available in five sizes for one, two, three, four and five 15-watt F lamps. Continuous reflectors for unbroken lines of light and 3-in. conductor leads at one end will be provided. Also available is a down-wiring kit including an end fitting, elbow, down tubing, base flange and armored cable connector. The company will continue to supply the standard No. 21A series of 15-watt F units in white finish and will make available as a separate item the continuous reflector in white for use with these 21A units.

Time Switch (234)



The new 948 Torkmaster, all-purpose time switch is designed to control off and on action for window lights, signs, oil burners, coal stokers, hallway and poultry house lights, etc. It may be adjusted in 15-minute steps without special tools. Indoor case is $3^{3}/_{4}$x4x$5^{1}/_{4}$ in.; is made of aluminum with special attachment for padlocking. This synchronous, self-starting unit handles up to 30 amp. on a single pole and operates on 110-125 volts, 60 cycles a-c.

Outdoor F Lights (235)

W. H. Long Co. has added a 4-tube, 160-watt unit to its Post-Lite line of fluorescents for outdoor lighting. The new unit is available with or without brackets, cord and plug for installation on present posts, building walls and corners. It is approximately 9,200 lumens, according to the announcement. Globes are round and are said to cast glareless light in all directions.

Streamer Lighting (236)

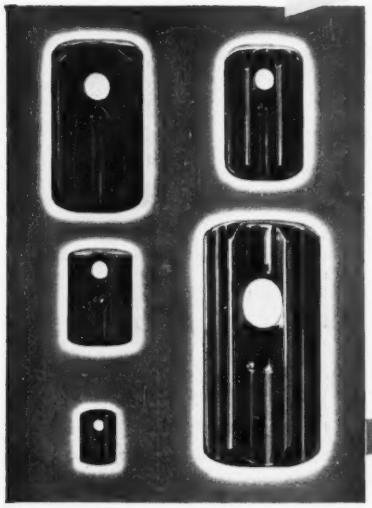
Neoline's new 352 streamer for outdoor lighting is available in any continuous length up to 2,500 ft., and in any linear spacing between sockets. According to the manufacturer, this product is waterproof, shockproof, crushproof and weatherproof.

Hand Light (237)

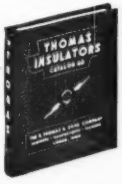
An extension hand light called the Neogard has been put on the market by Neoline Inc.; is claimed to be designed with special safety features.

STANDARDS of DISTRIBUTION QUALITY

Porcelain Pioneers For 76 Years



No matter what your porcelain insulator requirements, THOMAS can satisfy them . . . whether for high-voltage transmission or low-voltage distribution. Specifically, our distribution porcelain and hardware are backed by the same 75 years of ceramic experience and knowledge which distinguish THOMAS high-voltage suspension and pin-type designs. Consequently, THOMAS porcelain is the standard of comparison for discriminating engineers throughout the Electrical Industry. Make it *your* safeguard for reliable electrical distribution. *Always specify THOMAS—the best by line test.*



THIS FREE CATALOG

. . . illustrates and describes the complete THOMAS line. Enclosed in a loose-leaf binder, it provides a ready reference for all Transmission-Distribution Insulators and associated Line Hardware. New Insertions, as issued, are sent to all catalog holders.

The R. Thomas and Sons Co.

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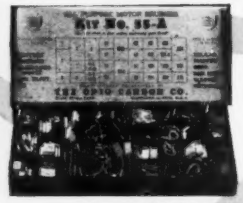
OHIO MOTOR BRUSH KITS

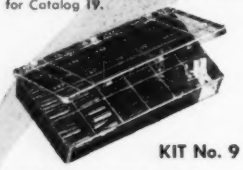
KIT No. 45A

Designed to service popular types of refrigerator motors, (AC current 1/8 to 2 H. P.). A handy assortment affording quick access to the right brush for the right application. Easy code identification.



KIT No. 35A

An all-purpose kit to service popular types of motors ranging from AC current 1/30 H. P. to 5 H. P. Contains 104 single brushes, 28 pairs of brushes. For complete listings write for Catalog 19.



KIT No. 9

A modern transparent package containing 168 brushes, 40 springs and 10 wicks for general purpose applications on motor driven appliances. Refills may be ordered.

West Coast Representative
C. F. BOWERS
544 S. San Pedro St., Los Angeles, Cal.

BUY YOUR CARBON BRUSHES FROM A SINGLE SOURCE

ORDER A COMPLETE STOCK TODAY!

THE OHIO CARBON COMPANY
12508 BEREA ROAD
CLEVELAND 11, OHIO

BULLETINS ETC.

Plant Distribution (238)

Information about industrial plant distribution systems is given in a 32-page booklet offered by Westinghouse. Colored diagrams of eleven basic distribution systems, detailed descriptions of the operating principles of the systems and installation photographs are included.

Switchgear, Controls (239)

Allis-Chalmers switchgear and control devices are covered in a 16-page guide recently released. Types and ratings are supplied, and standard wiring diagrams and photos of typical station combinations accompany data on push-button stations.

Insulation Tester (240)

James G. Biddle Co. has a new publication on its "Megger" insulation testers of the heavy-duty type. Improvements and accessory features are described and illustrated and specifications are given.

Switches (241)

General Switch is distributing a 68-page catalog of its line. Selection tables are included and cabinet and mounting dimensions and knockout layout are shown.

Connectors (242)

The third edition battery connector bulletin, No. GB-648, has been issued by Cannon Electric Development Co. This new bulletin includes 24 pages in two colors and contains photos, dimensional drawings, exploded views, application pictures and technical data on the line.

Induction Heating (243)

Tocco division of the Ohio Crankshaft Co. is offering a 48-page illustrated booklet on induction heating. The first part deals with general principles involved. Four other sections give case histories of induction heating for hardening, forging, brazing and annealing.

Lighting (244)

Edwin F. Guth has released a booklet describing new lighting equipment, including show window and, wall case units and Hy-Liters for accent lighting.

MV Lighting (245)

Line Material mercury vapor lighting is described in a data sheet recently published.

Interference Control (246)

Cornell-Dubilier has prepared a data sheet on its new capacitor-type filter to control radio interference caused by fluorescent lamps.

School Lighting (247)

Smithcraft is offering a 12-page booklet on school lighting.

Photographic Lamps (248)

G-E is offering a 12-page booklet covering photographic lamps and their applications.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

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246	247	248						

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UNITS FOR LINE CONSTRUCTION AND MAINTENANCE
Equipment Identification Code Chart
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CODE 9
Platform Body Boring Machine T Type Derrick Double Drum Winch Conventional Cab
CODE 12
Combination Line and Platform Body Boring Machine T Type Derrick Double Drum Winch Crew Type Cab
CODE 9A
Platform Body Boring Machine with Integral Derrick Single Drum Winch Conventional Cab
CODE 12A
Combination Line and Platform Body Boring Machine with Integral Derrick Single Drum Winch Crew Type Cab
CODE 10
Combination Line and Platform Body Boring Machine T Type Derrick Double Drum Winch Conventional Cab
CODE 23
Line Body Tripod Type Derrick Single Drum Winch Conventional Cab
CODE 10A
CODE 13
Platform Body Boring Machine T Type Derrick Double Drum Winch Conventional Cab
CODE 16A
Combination Line and Platform Body Boring Machine with Integral Derrick Single Drum Winch Crew Type Cab
CODE 13A
Platform Body Boring Machine with Integral Derrick Single Drum Winch Conventional Cab
CODE 29
Line Body Tripod Type Derrick Single Drum Winch Conventional Cab
CODE 14
Combination Line and Platform Body Boring Machine T Type Derrick Double Drum Winch Conventional Cab
CODE 30
Line Body T Type Derrick Double Drum Winch Conventional Cab
CODE 14A
Combination Line and Platform Body Boring Machine with Integral Derrick Single Drum Winch Conventional Cab
CODE 31
Line Body Tripod Type Derrick Single Drum Winch Crew Type Cab
CODE 15
Platform Body Boring Machine T Type Derrick Double Drum Winch Crew Type Cab
CODE 32
Line Body T Type Derrick Double Drum Winch Crew Type Cab
CODE 15A
Platform Body Boring Machine with Integral Derrick
CODE 35
FWD Heavy Duty Earth-Boring Machine with Integral Derrick Single Drum Winch Conventional Cab

ONE UNIT . . . one order . . . one responsibility! Yes, FWD's handy *built-to-code* chart makes your selection of line construction and maintenance trucks that simple . . . that trouble-proof. And here's why —

You quickly see the 38 varying — yet standardized — combinations that are available and the specific equipment each FWD carries.

You easily order the FWD you want because each unit is designated by an individual code number.

You issue only one order because FWD engineers and builds the *complete* unit — truck and equipment. That's why — when your FWD is delivered — it's ready to go to work immediately.

What's more — with FWD supplying the complete unit — buck-passing is eliminated. FWD accepts full responsibility.

Let FWD's code chart help simplify your equipment purchases. See Graybar or write us direct.

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: KITCHENER, ONTARIO

Built-to-Code

MOTORIZED UNITS

For Line Construction and Maintenance

Built by

Makers of America's Foremost Heavy Duty Truck

Distributed by Graybar

ELECTRA'S HUSBAND

"DON'T you get mad when you read editorials like this one in the *Bee* lambasting the power industry?" Electra asked one Saturday when we were visiting her sister in the Sacramento Valley.

"Time was when they griped me no end," I replied. "Every time I read one of the truth-twisting diatribes, I wanted to sit down to the typewriter and write them a burning denunciation. But not any more. Let the *Bee* and the rest of the so-called liberal press advocate government operation of the electric business, socialized medicine and federally subsidized housing. Every time they write a paragraph they drive another nail in their own coffin."

"How do you mean?" Electra inquired.

"Anyone with a grain of sense knows that a successful bureaucracy must control the avenues for influencing public opinion," I answered. "So the public press ultimately will get a dose of the same medicine. It, too, will be nationalized. I wonder how the editors and publishers will feel then? It will be too late to scream. But it will come just as it may come in England. I read a piece in *Advertising Age* a couple of weeks ago that said the press in England is on the list for nationalization in 1950. I hope every newspaper editor and publisher in this country saw it too."

For Electra's benefit and for such solace as it may give the stalwart fighters in this industry who are opposing further inroads of government into business, here is the piece in full:

"LONDON — If the socialist labor government of Britain is returned to office in 1950 for another five-year period, the British press will be fashioned into 'a series of public utilities,' and the government will exercise 'the run of the air' in the field of exposition.

"In a 'manifesto' of socialist labor policy just published, eleven of Britain's foremost policy makers have avowed their support for a continuous, effective propaganda machinery 'designed to maintain or alter beliefs and behaviour.'

"The new book, published by Essential Books Ltd., London, also reveals the attitude of the labor government toward advertising, and the methods by which the government plans to use advertising to achieve the goals which the Labor party has set for itself.

"In Stephen Taylor's chapter on socialism and public opinion (Mr. Taylor is a member of Parliament), he declares: 'The most powerful publicity is the publicity of events. A battle won, an industry nationalized, an output target achieved or a price level reduced is worth more than a multitude of pamphlets.'

SOCIALISM IN GREAT BRITAIN

"Mr. Taylor declares: 'Publicity and practice must march hand in hand. If publicity gets ahead of machinery for dealing with its results, or out of step with the facts of the situation, both publicity and administration are discredited.'

"He goes on to say that good publicity needs courage, high volume and frequency, painstaking preparation and proper timing of its release. In addition, he emphasizes the necessity for continuing and expanding the government 'information services' and attracting good men and women to this branch of government service.

"As for newspapers, he says (in what may well be the first semi-official declaration of the Labor party's intentions): 'The commercial control of a large part of the opinion-forming machinery of the country is scarcely less odious than state control would be. It should not be beyond the wit of man to devise a method of converting the mass circulation press into a series of public utilities, with complete freedom for their editors to select and publish what they deemed it was in the public interest to publish.'

"The policy on information media (which the eleven authors do not expect to crystallize until the period 1950-1955, if the Labor party is then returned to power) applies also to the British Broadcasting Corporation.

"Says Mr. Taylor: 'The BBC is, apart from Parliament itself, perhaps the most effective state instrument of expression which the human race has yet been able to contrive... In the field of exposition, the government has the run of the air. That it has so far failed to use it as it should is due . . . to the weight of parliamentary and administrative duties which ministers have had to shoulder.'"

FOR the first time since 1940 outdoor Christmas lighting in the West really staged a comeback. Lights were available in quantity. And people took pride in their displays.

Electra saw for the first time the famous Altadena Christmas tree row, one of the very first outdoor displays in the country. It was while she was commenting on its spectacular beauty that I brought up the subject of England's electric power situation again.

"The English people are beefing no end," I said, "because of the restrictions imposed on lighting over there. The only lighted Christmas trees that will be permitted are those sponsored by public bodies or religious or charitable groups."

"Why is that?" she inquired.

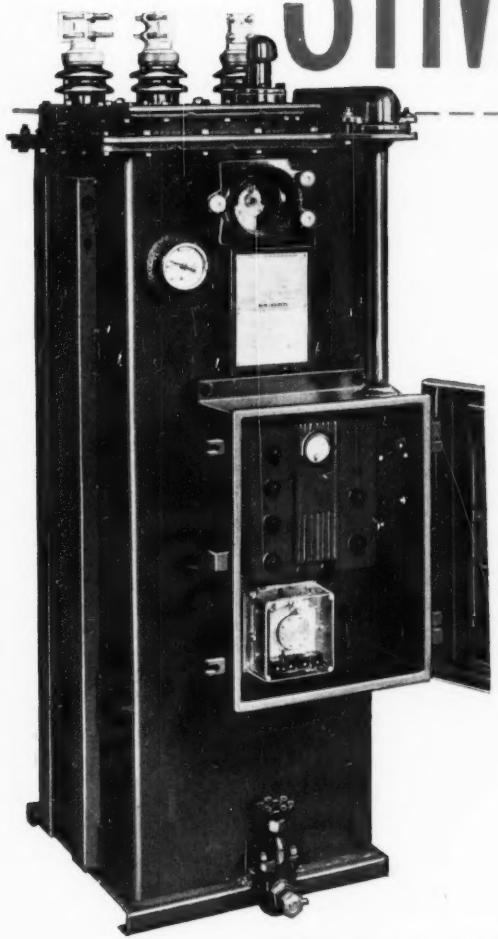
"The shortage of electricity," I replied. "When the power systems were nationalized, the government announced that conditions should be back to normal before 1950. Now they have advanced the date to 1953 or 1954. Like our country Britain did not expand its systems during the war. When the war was finished the nation was plagued by material and manpower shortages and by the immediate necessity for building back its export trade. So, unlike us, it did not undertake expansion programs.

"Despite earnest solicitations from merchants, the governing agencies refused to allow any Christmas lighting for store windows. Everywhere there is strict rationing of power. In fact they have threatened to increase domestic rates for winter use."

"I'm glad I'm not over there," Electra mused. "Why?" I asked.

"They might ration electricity to my electric blanket and that I could not take," she said.

*DFR Regulator Control Holds ±1 Volt Band and is the SIMPLEST!

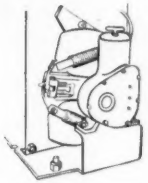


*DFR CONTROLS ARE EASY-TO-SET, ACCESSIBLE DUE TO UNIQUE UNIT CONSTRUCTION!

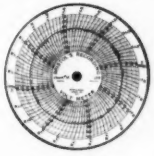
IN ADDITION TO maintaining a narrow ± 1 volt band width, the automatic control of the DFR regulator is the simplest of any regulator. With Allis-Chalmers unique unit control construction, the entire control is mounted on a single hinged chassis with a "dead front" panel. Controls are accessible . . . understandable. Relay setting is simplified because troublesome compounding or holding coils are eliminated. Elimination of these parts is possible because only micro energy is handled by relay contacts. And that's not all!

The DFR regulator requires only 8% excitation compared with the 25% excitation required by conventional regulators. High exciting current is important to you in terms of cost of equipment used for unnecessary excitation of regulators . . . in terms of installed capacitors . . . at $10 per kva . . . needed to balance high exciting current.

For further details on how you can get this simple, close voltage control, call your nearby A-C office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2338



An oil-immersed, rugged, self centering, shock absorbing, quick-breakmechanismisused.



Narrow band widths due to automatic "Feather Touch" control and full voltage integration.

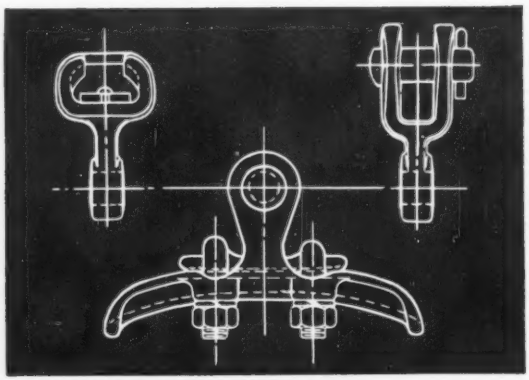
*DFR — the only station type step regulator you can buy for single phase duty. Sizes up to 6900 v, 250 kva. AFR — for 3 phase regulation.

ALLIS-CHALMERS

"Originators of the 5/8% Step Regulator!"

New BTC Forged Steel Suspension Clamps with Design Improvements

6200A-U
for Conductor



New Series 6200A Forged Steel Suspension Clamps for all Conductors and Ground Wires, except the Hollow Copper Types.

In the interest of improved field performance, the popular Series 6200 clamps has been redesigned. Lighter weight, shorter Clamp Body, improved Clamp-Body-Seat and Keeper contours, and maximum clamping pressure at Keeper center are factors in preventing possible cable-vibration damage. Greater Vertical-Line-Angle accommodation. Socket and new clevis connectors are forged steel. Absence of corona-inducing sharp edges.

Cable Sizes	Catalog Numbers — Type of Connector			Body Length	Ultimate Strength Pounds
	Socket	Clevis	None		
.125" to .46"	6200A	6230A	6240A	6½"	15,000
.312" to .60"	6201A	6231A	6241A	6½"	17,000
.187" to .60"	*6251A	*6261A	*6271A	6½"	17,000
.50" to .70"	6202A	6232A	6242A	7¼"	18,000
.50" to .82"	6203A	6233A	6243A	7¼"	18,000
.625" to 1.00"	6204A	6234A	6244A	8"	25,000
.625" to 1.15"	6205A	6235A	6245A	8"	25,000
.85" to 1.27"	6255A	6265A	6275A	9½"	25,000
1.125" to 1.375"	6206A	6236A	6246A	9½"	25,000
1.125" to 1.45"	6257A	6267A	6277A	9½"	25,000
1.125" to 1.60"	6207A	6237A	6247A	9½"	25,000
1.375" to 1.80"	6208A	6238A	6248A	10½"	25,000
1.375" to 2.00"	6209A	6239A	6249A	10½"	25,000
1.625" to 2.25"	6210A	6280A	6290A	11¼"	25,000
*Reversible Two-Groove Keeper for greater Cable Size Range					

Specify J or U Bolts by suffix "J" or "U" to catalog number. Specify Copper or Aluminum liners when required.

A postcard puts your name on our mailing list for data sheets.

Sold only through your insulator manufacturer

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DOUGLAS McKAY
GOVERNOR

To American Industry:

Oregon's industrial payroll has doubled since 1940 and her population has increased 49 per cent. New abundant supplies of America's lowest cost electric power serve Oregon industries and can be increased--up to 1000 per cent more--through the continued development of the Columbia River and its tributaries.

New markets for Oregon made products are expanding year by year. Industrial opportunities here are most attractive to investors requiring safety factors in long period operations.

The rare continuity-of-work record in Oregon's industry and the sane administration of local and state governmental units are not accidental. Labor, business, government and agriculture in Oregon cooperate to assure favorable conditions for new payroll producing industries. Oregon's door is wide open to sound industry and good management.

And Oregon is a great place in which to live!

Very truly yours,
Douglas McKay
Governor

Douglas McKay

One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

When selecting sites and seeking new markets in Oregon, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Utah, Washington, Wyoming . . . address Industrial Department, Union Pacific Railroad Omaha 2, Nebraska

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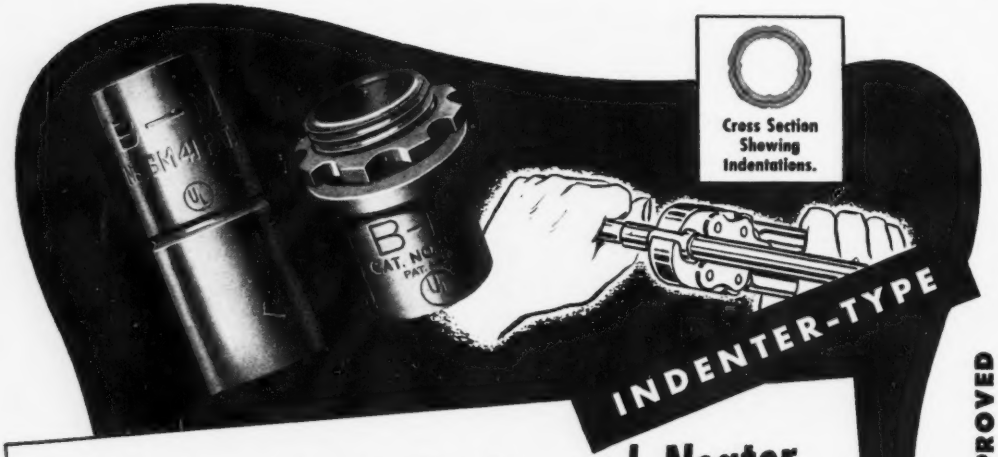
Road of the Streamliners



Install E. M. T. Faster and Neater with BRIEGEL Thin-Wall Fittings

NEATER • FASTER • STRONGER • APPROVED

All B-M Fittings Carry the Underwriters' Seal of Approval

FOR faster, neater and stronger thin wall conduit connections insist on either Briegel Indenter or Twiston Briegel Self-threading type all steel, one piece connectors and couplings.

B-M Indenter fittings, the only approved couplings and connectors of this type, have long enjoyed wider use and application than any other method of installing E.M.T.

The new B-M Twiston Self-threading fittings now make it possible to have threaded, raintight E.M.T. connections without the use of dies. Two complete turns with a pair of pliers threads the tubing and screws the fittings into a locked position, which results in the strongest connection possible and one that will withstand severe vibration.

Whatever the thin wall job might be, you will find that you can do it neater, faster and better with Briegel UL Approved E.M.T. fittings.

BRIEGEL METHOD TOOL CO.

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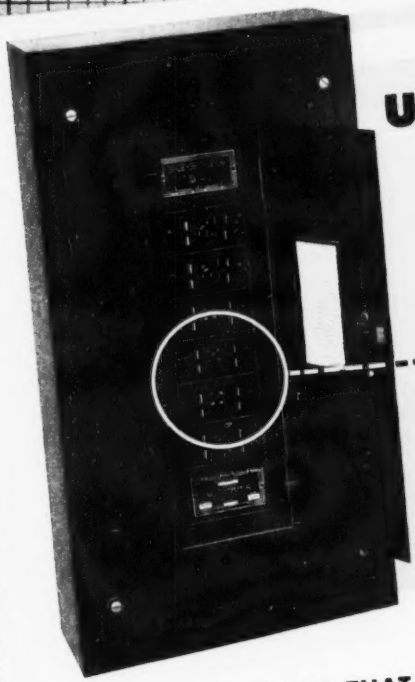
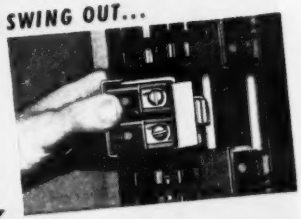


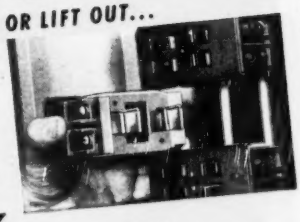
USE THIS *NEW* NMO "*PLUG-IN*" PANELBOARD

Wherever a large number of branch circuits for lights, appliances and business machines must be switched and protected.

1 SWING OUT...



2 OR LIFT OUT...



3 ATTACH WIRES...

4 "PLUG-IN"

HERE ARE FEATURES THAT REALLY COUNT:

✓ **Thermal-Coilless Magnetic**—Multi-breaker unit gives 2-way circuit protection. Thermal element holds harmless momentary overloads but trips on continuous overcurrents before wire insulation is overheated. Magnetic element trips quickly on "shorts" to localize damage.

✓ **Simple to Add or Change Circuits**—Four circuit Multi-breaker units have "Plug-in" feature. Any combination of 15, 20, 30, 40, or 50 ampere circuits available "off-the-shelf." Dummy units can be inserted to anticipate future requirements.

✓ **Smaller Size**—Compact Multi-breaker unit permits more circuits and larger wiring gutters without increase in overall panel size. Better utilization of wall and column space.

✓ **Easy to Wire**—Multi-breaker units can be swung or lifted out to attach wires. Approved connector eliminates "looping."

Illustrated NMO Bulletin gives complete information on the new Panelboards. Address Square D Company, 4335 Valley Blvd., Los Angeles 32, California.

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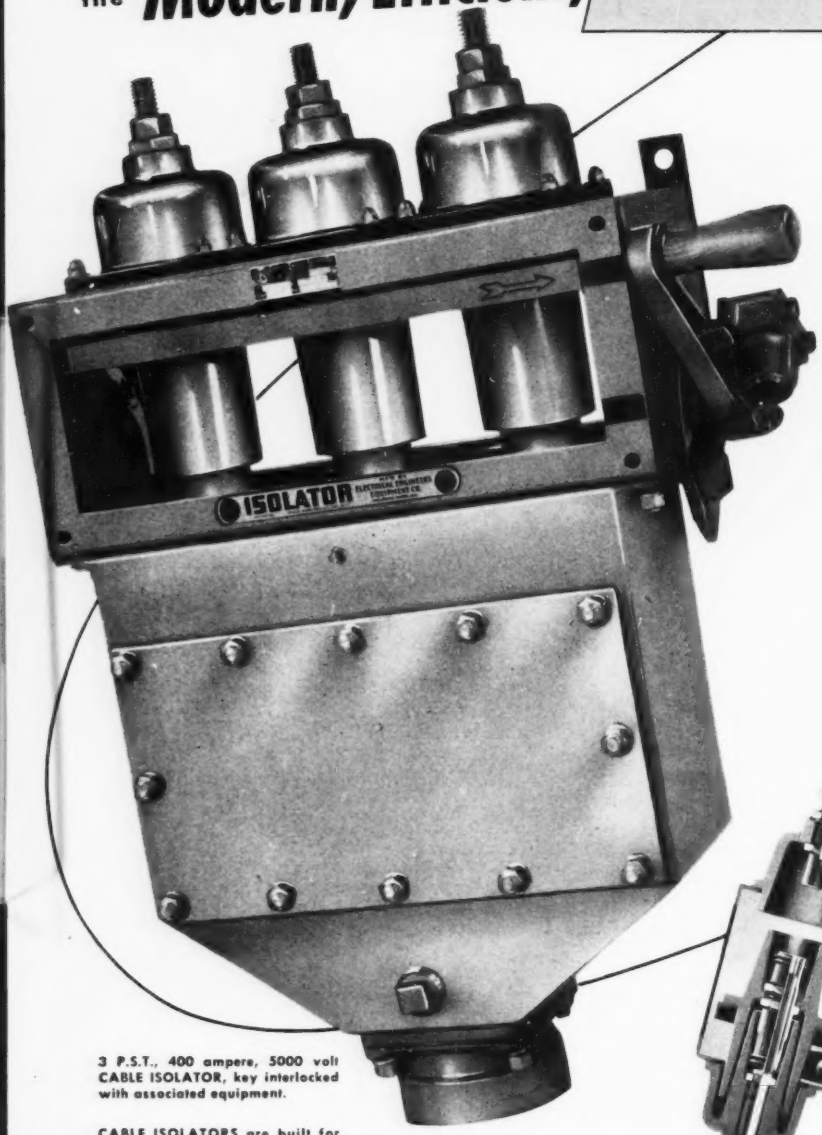


3 P.S.T., 400 ampere, 5000 volt CABLE ISOLATOR, key interlocked with associated equipment.

CABLE ISOLATORS are built for voltage ratings up to 15,000 and for ampere ratings up to 600.

Points of Superiority

1. Safety First. All live parts are shielded after taping up ISOLATOR stud connections.

2. ISOLATOR for disconnecting, Pothead for terminating, built as one compact unit.

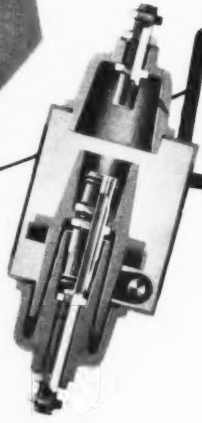
3. Due to the straight line movement of contact members, the device takes up no more room in the open than in the closed position.

4. Insulating barriers between phases not required. The ISOLATOR provides its own.

5. Operating handle, when released, automatically locks ISOLATOR in open or closed position.

6. Gasketed, removable cover plate enables installer to properly train cable leads during installation.

7. Nine styles of cable entrances are available.



YOU CAN DO IT BETTER WITH AN ISOLATOR

Cross-sectional view of the ISOLATOR in open position.

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THREE E — ELECTRICAL ENGINEERS EQUIPMENT CO. — MELROSE PARK, ILL. U.S.A. — THE MARK OF QUALITY

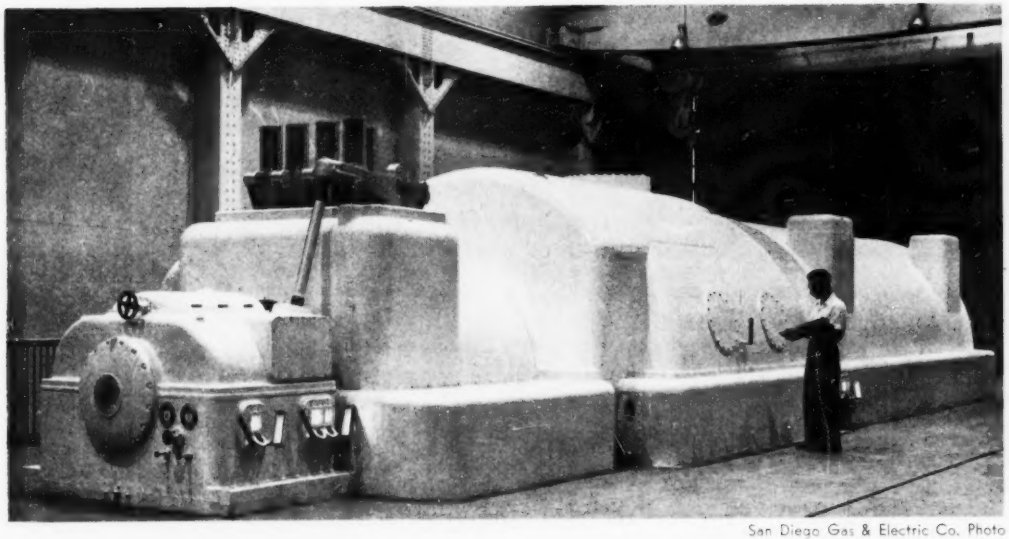
ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

FEBRUARY 1949 Vol. 102, No. 2

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



San Diego Gas & Electric Co. Photo

THE WEST'S NEW POWER ERA

As the West approaches its manifest destiny as a highly integrated industrial and agricultural empire, it becomes more and more apparent that electric energy is playing an increasingly important role in the region's growth. No area of the world uses electricity more profusely and none gets its power more cheaply. With just slightly more than 12.5% of the U.S. people, the region now has 17.9% of the generating capacity and uses more than 19% of all the electric power produced. If present trends continue, by 1952 these electrical gages will rise to 20 and 25%.

Potential electrical growth for the region as a whole may be gaged from a study recently made by the California Public Utilities Commission. By relating electrical requirements and population growth, the PUC comes up with some startling figures. In 1920 electrical demands were 1,100 kwh. and .20 kw. per capita. By 1940 these unit figures had increased to 1,900 kwh. and .36 kw. per capita. Should these trends continue, the average requirement would be 2,900 kwh. and .54 kw. by 1950. In 1960 demands would be 3,600 kwh. and .67 kw. and by 1970 the figures would have reached 4,200 kwh. and .79 kw. per capita. The averages are typical for the entire Pacific Coast region.

There are valid and understandable reasons for this unparalleled development. So long as the Westward migration of people and industry continues, the demand for electric power will rise at an accelerated rate. It's a truism that people make markets. The West has been getting the lion's share of new people. Population growth for this region is at a rate five times that of the U.S. Since 1940 the number of people in this area has increased 40%; U.S. growth has been 8%. Industry grows to serve growing markets.

Another truism is that high incomes and high purchasing power assure rich and profitable markets for business and industry. Here again the Far West excels. Average individual incomes are well above the national figures—seven of the eleven Western states have a greater average effective buying income than the national average. Nine are above the average for the nation in retail sales per family. In cash income per farm ten Western states exceed the U.S. average and the list is headed by California, Nevada and Arizona.

Another important asset is that industry recognizes the favorable climate that exists in this region. The term climate includes more than freedom from humid heat and crippling blizzards (or should we mention that). It means the attitude of the people—their hospitality, their pioneering spirit, their receptiveness to new things and new ideas, their cooperative disposition.

Finally there are the region's great natural resources — fuels, minerals, chemicals, forests, fisheries, hydroelectric power, soil and climate.

Hence there is a broad base on which the electrical industry of the Far West is building its markets and its future potentials. The facts and figures detailing this electrical growth are reported and interpreted in the pages that follow. Expansion plans are detailed and then integrated into load and sales accomplishments and potentials.

Table I—Comparison of National to Western Operations for 1947 and 1948

	11 Western States		United States		Percent West to U.S.	
	1947	1948	1947	1948	1947	1948
Energy generated (Millions of Kwh.)	49,105,973	53,837,438	255,725,173	280,418,557	19.2	19.2
Energy generated in hydro plants (Millions of Kwh.)	37,712,588	41,977,771	74,419,811	81,377,223	50.7	51.6
Energy generated in fuel plants (Millions of Kwh.)	11,031,254	11,859,667	177,305,362	199,041,334	6.2	5.9
Percentage of hydro to total generated	76.8	78.1	29.2	29.0	...	...
Installed generator capacity (Kw.)	9,048,109	9,842,462	52,411,488	54,968,075	17.3	17.8
Installed hydro generator capacity (Kw.)	6,362,092	6,898,816	14,970,274	15,570,509	42.4	44.3
Installed fuel generator capacity (Kw.)	2,686,017	2,943,646	37,441,214	39,397,566	72.0	72.3
Revenue from energy sales (Thousands of Dollars)	516,800	596,200	3,852,765	4,287,000	13.6	13.9

Source—Federal Power Commission. Data from EEI. 1948 estimated.

Table II—Ten-Year Generation Record for Western Public Utilities

	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
Arizona	717,825	696,787	1,327,485	1,404,299	1,459,689	2,630,936	3,198,771	3,770,667	3,435,988	2,823,650	2,769,495	3,227,158
California	9,632,178	9,426,519	9,403,588	9,788,869	10,383,352	11,383,154	14,776,371	15,887,456	15,943,740	17,313,659	19,441,429	20,079,171
Colorado	721,482	731,395	760,445	791,967	818,213	977,690	1,097,260	1,136,831	1,128,655	1,168,151	1,375,653	1,576,814
Idaho	972,212	992,278	1,126,518	1,175,305	1,142,341	1,244,946	1,338,183	1,233,764	1,263,032	1,334,914	1,507,474	1,604,728
Montana	1,319,637	1,324,151	1,575,016	1,769,124	2,177,623	2,248,133	2,597,086	2,459,781	2,318,130	2,465,805	2,764,383	2,880,304
Nevada	1,152,788	1,491,205	1,855,042	2,324,176	2,403,747	2,432,124	3,228,132	3,244,462	2,590,404	2,488,076	2,908,189	3,614,066
New Mexico	255,378	262,124	281,508	316,862	368,499	409,854	470,931	511,165	556,892	604,992	753,897	828,055
Oregon	1,392,177	1,253,615	1,484,468	1,739,903	2,909,772	3,651,159	4,619,280	4,785,539	4,183,748	4,148,566	5,456,577	5,463,645
Utah	507,415	340,172	425,474	577,641	564,812	604,393	619,280	436,943	416,956	457,169	562,198	584,900
Washington	3,734,715	3,400,683	3,642,610	3,944,184	4,499,031	6,494,920	8,926,679	10,311,897	9,689,862	9,038,842	11,230,994	13,632,597
Wyoming	131,139	139,205	141,135	184,701	217,343	243,697	290,538	255,575	263,403	315,898	325,684	381,100

FPC reports for 12 months ending November.

Table III—Number of Utility Customers at End of 1948

Class of Customer	11 Western States			United States		
	1947	1948	Change	1947	1948	Change
Residential	4,207,883	4,490,030	282,417	31,621,959	33,551,100	1,929,141
Rural	414,395	455,200	40,805	1,522,136	1,711,500	189,634
Commercial and industrial	781,287	836,000	54,713	5,152,258	5,369,400	217,142
Municipal, railway and miscellaneous	20,776	21,900	1,124	135,597	142,900	7,303
Total	5,424,341	5,803,100	379,059	38,431,950	40,774,900	2,342,950

Table IV—Type and Capacity of Utility Generators, November 1948

State	Utilities	Plants	Total Capacity Kw.	Generator Capacity of Plants Operated by Water Power No.	Water Power Capacity	Steam Power No.	Steam Power Capacity	Internal Combustion Engines No.	Internal Combustion Engines Capacity
Arizona	18	52	708,095	15	540,759	9	114,657	28	52,661
California	23	160	4,011,564	121	2,256,835	26	1,707,669	13	46,060
Colorado	43	87	379,799	30	86,585	24	272,148	33	21,066
Idaho	16	53	307,968	44	303,046	1	400	8	4,522
Montana	16	34	390,161	20	373,138	4	11,968	10	5,055
Nevada	8	15	592,132	10	586,135			5	5,997
New Mexico	20	45	187,797	6	25,090	13	132,262	26	30,445
Oregon	19	72	908,626	51	712,527	13	190,310	8	5,789
Utah	27	77	178,804	58	92,445	4	68,750	15	17,609
Washington	20	56	2,078,444	40	1,872,736	10	202,320	6	3,388
Wyoming	29	55	99,072	15	49,520	12	40,560	28	8,992
11 Western States	237	706	9,842,462	410	6,898,816	116	2,741,062	180	202,584
United States	1,613	3,877	54,968,075	1,476	15,570,509	1,044	37,856,944	1,357	1,540,622

Table V—11 Western States Regional Market Development

Item	Year	Amount	Per Cent of U. S. Total
Population	1940	13,883,265	10.54
Families	1940	4,135,440	11.86
Education—Persons 25 years and over, number	1940	8,370,478	11.19
Schooling—no year	1940	210,828	7.53
Grades—7-8 years	1940	2,654,058	10.26
High—4 years	1940	1,669,858	15.83
College—4 years	1940	511,419	15.01
Dwelling units, urban	1940	2,721,514	12.59
Dwelling units, rural	1940	1,820,319	11.59
Farms	1940	509,671	8.36
Crops and livestock value	1939	$1,512,561,000	16.59
Industry, establishments	1939	21,000	11.67
Industry, value of products	1939	$4,729,155,500	8.32
Wholesale establishments	1939	27,232	13.58
Wholesale value of sales	1939	$6,137,757,000	11.11
Retail Stores	1939	213,027	12.03
Retail value of sales	1939	$5,726,300,000	13.63
Passenger auto sales	1940	402,235	12.65
Effective buying income, estimate	1940	$9,171,281,000	12.36
Population	1947	18,024,000	12.57
Families	1947	5,765,400	14.49
Retail sales, total estimate	1947	$18,984,810,000	16.14
Food store sales	1947	$4,954,884,000	15.83
General merchandise	1947	$2,263,548,000	14.42
Drugs	1947	$564,506,000	15.57
Wholesale sales, estimate	1947	$19,332,442,000	12.98
Gross farm income	1947	$2,615,215,000	14.12
Bank deposit total	1944	$13,094,809,000	12.86
Demand	1944	$7,994,022,000	12.30
Time	1944	$5,099,787,000	13.80
Motor vehicle registrations	1946	5,543,730	16.33
Effective buying income, gross	1947	$26,003,288,000	13.42

1948-1949 HIGH LIGHTS

Production Despite a serious drought and imposition of daylight savings time from March to Dec. 31 in California, energy production in the Far West soared to unprecedented heights. Generator output for 1948 was 53,837,438,000 kwh., up 9.7% from 1947. In this primarily hydroelectric region fuel-generated power filled in for lack of water, providing 21.9% of the total. Even so, the West uses more than half of the hydro power generated in the entire United States.

Capacity Even though the net generating capacity of the region rose to 9,842,462 kw., the Far West is still far short of an adequate reserve. New capacity added reached a record total of 1,120,000 kw., much of which was installed during the last half of the year. However, the West's power construction programs are just beginning to pay off—in 1949 additions will add up to 1,350,000 kw. A million-a-year growth rate will be maintained through both 1950 and 1951.

Expenditures Expenditures for new facilities by power companies and municipal systems in 1948 climbed to a lush figure of $375,000,000. This does not include any federal power construction funds, which totaled just under $75,000,000, making 1948 the greatest construction year in history. The expenditures were distributed like this: fuel plants, $87,000,000; hydro stations, $70,750,000; transmissions, $58,000,000; distribution, $151,000,000 and the remainder to general plant. Maintenance required an additional $38,250,000 of expenditures.

Customers New customers continued to flock to the lines of Western utilities — 379,059 more in 1948. This 7% gain brought the total to 5,803,100. The 282,417 new residential customers give the region a total of 4,490,300 in that classification. No section of the U.S. showed the same growth in commercial and industrial customers, which is indicative of the continuing business and industrial development of the Pacific area. And the Far West has more than a fourth of all the farm customers.

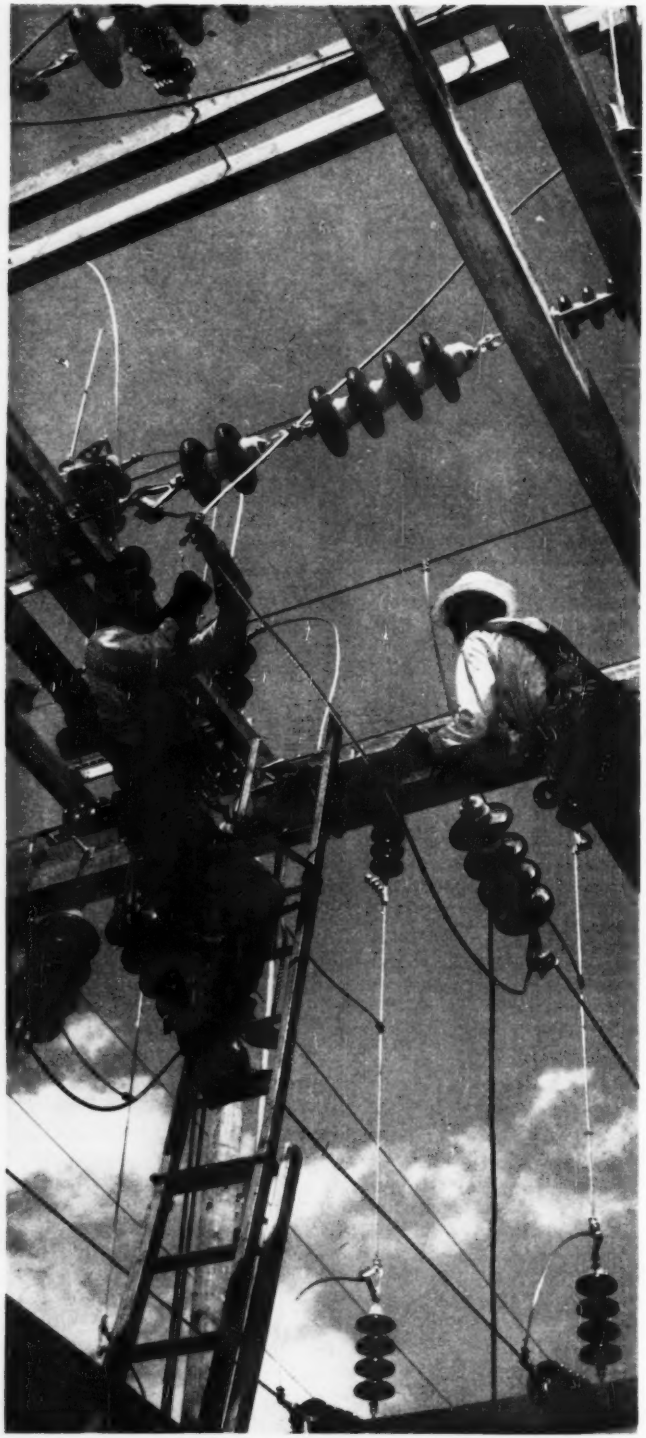
Budgets For 1949 power companies and municipal systems have set budgets one-third higher than last year. The figure is $450,000,000, more than a fifth of the total for the U. S. When the $285,000,000 of power facility budgets of REA, the USBR, the Army engineers and Bonneville are added, the total is a whopping $735,000,000.

Energy Use Westerners use electricity with freedom and abandon because of its availability and low cost. This is borne out by the output per customer—9,600 kwh. for the West as contrasted to 7,100 kwh. for the U.S. On the average, Western generators worked longer hours also; production was 5,700 kwh. per kw. as compared with 5,300 kwh. for the nation.

Industry Industrial migration to the Far West shows no sign of declining. A growing population, higher than average incomes and purchasing power, ample natural resources and a great potential export market are attracting more and more firms. Industry is growing at three times the national rate. Almost one-fourth of all new industrial plants are locating in the region. Since 1945 upwards of $2,000,000,000 in new and expanded industrial facilities have been built in the West. This Westward trend is continuing.

Construction Except for one war year — 1942 — last year saw more construction in the West than in any previous twelvemonth. Heavy construction shaded $1,500,000,000. Residential building topped $1,250,000,000. The combined figures approach a fifth of the national total. For this year home construction will be down—high costs and lagging demands are responsible. However, heavy construction will be up between 5 and 10% to new high levels.

Appliances Even though pipelines filled and buyers became choosy, 1948 was a record appliance year both in unit sales and dollar volume. Washer sales exceeded 550,000 units and more than 110,000 ironers were purchased. Refrigerators topped 425,000 and upwards of 210,000 electric ranges went into homes of Western customers. Water heater sales exceeded any previous year. However, 1949 may be different. Sales slumped on all fronts in November and December (television excepted). There will be more selling and less order-taking this year. Cooperative promotional campaigns will be popular once more.



Western utilities will spend 375 millions for new construction during 1949, up 20% over last year. New generation also up by 20%

FOR the electrical utilities of the West the year 1948 was one of continued system expansion at a greatly accelerated pace to cope with ever-increasing loads. It was a year that operating men are glad to have behind them. California had its early-year power shortage due to winter drought conditions. The Pacific Northwest had its now perennial power supply problem. With large blocks of new steam and hydro generation brought in last year in California and the Pacific Southwest (see table page 85) and additions under construction and planned, that region now seems assured of an ample power supply. In the Northwest, there is no relief in sight until new federal plants are brought in in 1953-54. In its efforts to provide generation and other facilities to meet loads and to try to create some semblance of reserve, the industry of the West during 1948 expended the record-breaking sum of $375,000,000. Budgeted for 1949, is $450,000,000, topping '48 by 20%.

By far the larger part of last year's expenditures was for new generation and the related transmission and transmission substations. There was added in new generation, 1,120,700 kw.; in major transmission, 2,056 miles of line; in transmission substation capacity, 2,178,200 kva. More than 307,000 new customers, and increased use by existing customers, brought about a general load increase for the West as a whole of approximately 10%. Distribution systems also came in for great expansion during 1948. Principal activity centered around distribution substations and capacitor installations. Hundreds of distribution substations, mostly of the factory-built unit type, were added to create new primary feeders. In the neighborhood of 200,000 kva. in capacitors were installed.

Washington Water Power Co. Photo

BIG PLANS FOR 1949

This year will see a continuation and acceleration of last year's construction activities. New generation scheduled (again see table page 85) is 1,352,000 kw.—a 20% increase over '48. Major substation power transformer capacity will also increase by about 20%. New distribution facilities will come in for a greater proportion of system betterments than during 1948 and previous years. An analysis of utilities' budgets for 1949, reveals the rather surprising fact that at least half of the 375 million budgeted will be spent on distribution. This means that even more unit substations, line transformers, conductors, capacitors and other distribution equipment will be installed during 1949 than during the past year. Much, too, will be spent for rebuilding and general rehabilitation.

Rural electrification in the West will show a decline in activity during 1949 and future years. According to REA, 84.4% of all farms in the eleven Western states now have central station service and the 77,288 unelectrified farms remaining pose the biggest problem faced in electrifying the West because of now having to reach out into the very sparsely settled areas. During 1948, there were 17,760 farms added to *all* rural systems of the West, bringing the total served to 417,148, or the 84.4% mentioned.

The reports of the individual utilities and agencies that follow give details of specific programs of each.

Federal

REA

Great strides were made during the first eleven months of 1948 in the rural electrification program in the eleven Western states. But as the year closed, the REA-financed borrowers faced the solution of three extremely difficult problems before the expansion could reach its maximum rate. The problems were the worsening of the power situation with a narrowing between supply and demand; the shortage of aluminum conductor; and the economics of building lines out into the most thinly settled areas of the West.

REA borrowers energized twice as many miles of line and connected four times as many consumers during the first eleven months of 1948 than last year. During that eleven-month period, the borrowers energized 10,604 miles of line and connected 24,135 farm families and other rural consumers, bringing the cumulative totals as of Nov. 30, 1948, to 52,453 miles of line energized and 144,638 consumers connected. Ten new systems were energized during the year: three in Arizona, two in Colorado, one in Montana, one in Utah, two in Washington and one in Wyoming.

REA approved a record volume of construction loans to the borrowers in the Western states, more than half again as much as last year. For the year, REA approved $35,149,000 in loans. These loan funds were to finance rural electric facilities including an additional 9,449 miles of line to serve 25,674 farms and other rural establishments. Five borrowers received initial loans during the year: one in California, one in Colorado, two in Montana and one in New Mexico. As of Dec. 31, 1948, cumulative total construction loans approved were $138,222,154.

As of June 30, 1948, 84.4% of the farms in the eleven Western states, compared with 68.6% nationally, had central station electric service. During the 1948 fiscal year, an additional 17,760 farms were connected to *all* rural distribution systems in the eleven states, bringing the total farms electrified to 417,148.

The remaining 77,288 unelectrified farms represented the biggest problem yet faced in electrifying the West's rural areas. A partial solution for area-coverage electrification — service to all regardless of location—was being achieved in western Colorado, Arizona, New Mexico and Wyoming, by the acquisition and integration of small town and village systems with the cooperatives rural systems. These acquisitions make it possible to average out the farm density per mile of line built which makes the REA loans feasible.

Power use has shown a tremendous increase in all the Western states. Connections of new consumers and increased use of electricity by old consumers has placed a tremendous demand upon power production, resulting in severe shortages in certain areas in every one of the eleven states. In several areas REA has approved loans to finance generation facilities; but in most of the areas the borrowers were forced to rely upon the overloaded facilities of commercial and public suppliers for their power.

The shortage of aluminum conductor limited the construction completed during the 1948 calendar year. In several areas borrowers have been forced to use higher priced conductor limiting building into sparce areas.

Tables of Western REA operations appear on pages 86 and 87.

Army Engineers

Projects of the U. S. Army Engineers will be found listed under the states of Oregon, Washington, Idaho.

Bonneville

Report of the Bonneville Power Administration is on page 92.

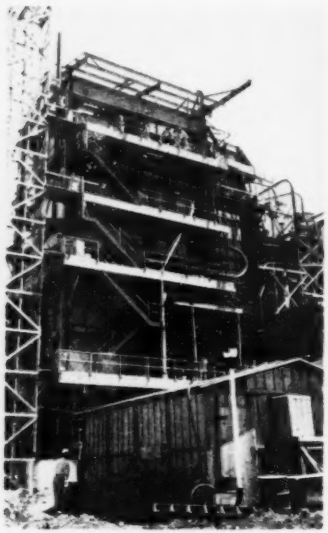
Bureau of Reclamation

Projects are listed under the states in which they are located. A tabulation of USBR current and future power developments in the West appears on page 82 and a tabulation of transmission lines on page 83. During 1948, $131,500,000 was spent by the Bureau of Reclamation on Western power projects. For 1949, $216,700,000 is budgeted. Generating capacity added to federal plants in the West during 1948 amounted to 554,000 kw.; transformer capacity added, 58,250 kva.; miles of transmission, 230 kv., two miles; 115 kw., 218 miles; 69 kv., 99 miles, and 34.5 kw., 26 miles. Anticipated additions for 1948 are: generating capacity, 374,000 kw.; transformer capacity 268,000 kva.; 230-kv. transmission, 56 miles; 161 kv., 129 miles; 115 kv., 483 miles; 69 kv., 44 miles, and 34.5 kv., 62 miles.

Arizona

Arizona Power

A total of $450,000 was spent during 1948 for new construction expenditures. We have a total of $550,000 budgeted in 1949 which includes $150,000 for a joint steam plant at Saginaw Lumber Co.'s mill at Flagstaff. A power purchase agreement was entered into with Southwest Lumber Co. at Flagstaff, thus enabling the lumber company to construct a 3,000-kw. steam-electric plant, using wood waste for



New boiler being rushed to completion by Central Arizona Light & Power Co.

West Point power house is one of two completed plants in a construction program of Pacific Gas and Electric Co. embracing five new hydroelectric plants

fuel. Our company purchases all power from this plant in excess of its own requirements. This plant came on the line during 1948.

A total of 50 circuit miles of new distribution line was added during the year, including 27 miles of 11-kv. line to serve the communities of Pine and Payson, which towns did not have central station service prior to 1948. A new 44-kv. transmission line 27 miles in length was constructed to bring central station service to Snowflake and Showlow under a wholesale power contract. This district had a severe shortage of electricity prior to the construction of the new transmission line. We added 1,486 new residence and commercial customers during 1948, an increase of 10.5%.

A new power plant, a joint venture of Saginaw-Manistee Lumber Co. at Flagstaff, and ourselves, will be completed in February 1949. This plant is a 4,000-kw. steam-electric plant which will burn waste wood as fuel. The balance of the money budgeted for 1949 will be spent on extensions to our distribution system to take care of new business. We anticipate adding 1,500 new customers to our system in 1949. —*Malcolm M. Bridgwater, vice-president and general superintendent.*

Boulder Canyon Project, USBR

The installation of two 82,500-kva. generators for Hoover Dam power plant, contracts for which were recently awarded, will provide an increase in the total capacity of the plant from 1,034,800 kw. to 1,199,800 kw. With the installation of these two additional units, which are to be completed and installed by May 1952, only two spaces for generating units will be unoccupied.

Central Arizona L. & P.

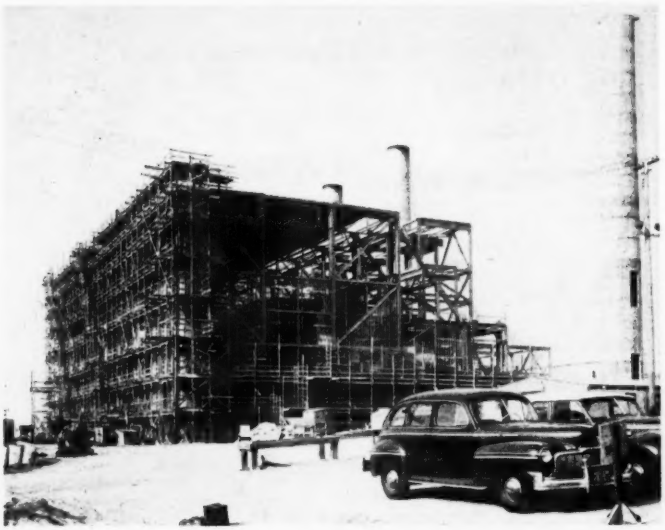
Expenditures for new electrical facilities during 1948 amounted to approximately $5,000,000. Included in this amount is an expenditure of approximately $2,200,000 to complete the installation of a 30/33-megawatt steam generating unit at the company's steam plant west of Phoenix. Total cost of the complete installation is approximately $3,200,000. Construction was started in the fall of 1946 on this unit and completed in July 1948.

The 1948 installation brings the plant generating capacity up to 73 megawatts in four generating units and five boilers. The company in addition to its own steam generation purchases hydro energy from the Parker project of the U. S. Bureau of Reclamation and the Salt River Valley Water Users Assn.'s hydro project. Work is now in progress on an 11.5-megawatt Elliott turbogenerator with a combustion boiler to be completed in 1949. At the same time construction is progressing on the installation of a 60/66-megawatt Westinghouse turbogenerator unit with a combustion boiler—all to be completed in 1950. This additional construction involves an expenditure of approximately $10,000,000 total for additional generating facilities to be completed in the next two years, bringing total generating capacity to 150 megawatts.

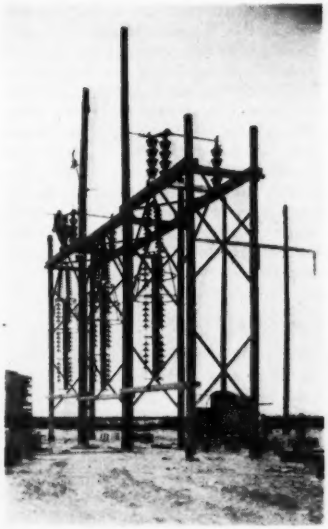
System peak load reached an all-time high of approximately 120 megawatts, which is approximately 25% increase over 1947. Customers added during the year far exceeded the estimate made when preparing the 1948 budget, there being approximately 7,000 customers added, making a total of 62,000 customers on the lines at the end of 1948. The kilowatt-hour sales increased approximately 93,000,000 over the previous 12 months.

The 69-kv. transmission system was expanded by adding approximately ten miles, and distribution line mileage increased approximately 160 miles. Electric service was extended into more rural areas in southwest Maricopa and northern Yuma counties constituting approximately 40 miles of 7.2/12.5-kv. distribution system. Distribution substation capacity added at several stations amounted to approximately 7,500 kva. and distribution transformers added exceeded 25,000-kva. capacity. To improve voltage and power factor conditions approximately 7,600 kva. of capacitors were added to the distribution system during 1948.

The 1949 construction budget calls for an expenditure of approximately $6,000,000, of which $2,900,000 covers additional generating facilities; $800,000 for 69-kv. transmission and



Second section of Southern California Edison's new Redondo steam plant will house last two of four 66,000-kw. units installed to meet rapid load growth



Wood switch structure of Drop 4 substation in Imperial Irrigation District

$2,300,000 for distribution facilities. Approximately 80 miles of 69-kv. transmission lines are planned to be added to the network, some of which will be 12-kv. lines converted to 69-kv. use. New distribution lines to be added to the system are estimated at 170 miles to meet continued load growth. It has been the policy to take all load growth on the 12-kv. distribution system, and for some years a program of conversion from 4-kv. to 12-kv. distribution has been in progress. The year 1949 will about complete this conversion project, leaving only the downtown area of Phoenix and some adjacent areas still being served from the 2.3/4-kv. system. A total of 33,000 kva. in new substation capacity is being added to the system and 10,000 kva. of capacitors, all of which will relieve the present critical overloaded substations and equipment.

Pilot wire relaying and supervisory control of all substations in the Phoenix area is being installed and will be completed this year. This control system has also been extended to some of the important transmission substations. This type of control and the FM radio communication units installed in approximately 40 transportation units has materially benefited the dispatching organization in minimizing outages.

Building activity in the Phoenix area is still progressing at a rather high rate, and no doubt will continue into 1949. It is being estimated that a minimum of 6,000 new customers will be connected during the year and a conservative estimate of the peak load is 135 megawatts.

The company moved its general offices into new quarters at 501 S. Third Ave. Two floors were added to a modern warehouse building and a portion of the building converted to office space for engineering and stores sections and a cafeteria added. All of these quarters are completely air conditioned. This move puts the general offices adjacent to the operating, construction, maintenance and service sections of the company and has materially coordinated the company's operations. The business office for the Phoenix area, consisting of collections, contracts and service contacts, is still being maintained in the downtown section in its former quarters.—*George H. Groh, vice-president in charge of operations.*

Davis Dam Project, USBR

Construction of the diversion channel, forebay and spillway, and outlet works at Davis Dam had progressed sufficiently in 1948 to allow diversion of the Colorado River. The site of the dam proper was unwatered, the cutoff trench excavated, and backfill of impervious material was begun in 1948. The dam is to be essentially completed by October 1949, and construction of the 225,000-kw. power plant is to start in 1949.

Construction is to continue on the following transmission lines: Second Phoenix-Tucson, 115 kv., 115 miles; Davis-Parker, 230 kv., 70 miles; and Second Parker-Gila, 161 kv., 128 miles. Construction is planned to start in 1949 on the following transmission lines: Tucson-Cochise, 115 kv., 74 miles; Davis-Hoover, 230 kv., 70 miles; Davis-Prescott, 230 kv., 145 miles. Work will begin also on substations near Blythe, Calif., and at Prescott, Mesa, Coolidge and Maricopa, Ariz.

Salt River Valley Assn.

Our expenditures for the year 1948 for new and improved facilities amounted to approximately $1,200,000. No major additions or improvements were made, with the exception of completion of an additional gas line to increase fuel delivery to our steam plant. We are appropriating for 1949 an amount of $2,500,000 for new and improved facilities among which will be an addition to our steam plant, the installation of a new 7,500-kw., 60-cycle generator, which we hope to have in production by July 1. Complete expenditure of this amount will depend in part upon a sufficient supply of water for adequate hydro production.

No new generating capacities were added during 1948, on the contrary we lost 10,000-kw. capacity by the return to the government of the U. S. Navy mobile unit. Added transformer capacity amounted to approximately 3,750 kva. of rural substations and 1,000 kva. of distribution substations. New transmission lines, 11-kv. and up,

amounted to about ten miles and new distribution lines to about 90 miles. During the year approximately 3,600 meters were added to our system.

The 1948 system peak was 148,200 kw., a slight increase over 1947; had it not been for the necessary curtailment of power this peak could have reached a maximum of 167,600 kw. Unless there is a considerable improvement in stored water for generation, our 1949 peak will not exceed that of 1948.—*T. M. Morong, chief engineer.*

Tucson G.E.L. & P.

Expenditures for new and improved facilities amounted to $2,000,000 in 1948 and will be increased to approximately $4,400,000 in 1949 by scheduled additions to generating plant.

During 1948 the company added 4,000 kw. in diesel generating capacity, 4,900 kva. in substation and 12,600 kva. in distribution capacity. Ten and one-half miles of 13.8-kv. line and 120 miles of 2.4- and 4.1-kv. line were built.

In 1949, 23,000 kw. in generating capacity will be added in two 11,500-kw. units. Transformer capacity will be boosted by 8,100 kva. in substation and 12,000 kva. in distribution facilities. Construction of 18.5 miles of 13.8-kv. line and 100 miles of 2.4- and 4.1-kv. line is planned. It is anticipated that 5,000 customers will be added and that system peak will be 8,000 kw. higher.—*J. R. Snider, president.*

California

Anaheim L. & W. Dept.

Construction expenditures totaled $12,804 in 1948 and are expected to reach $28,250 in 1949. Only major project in 1948 was work on the department's new 3,000-kva. unit substation; this 12-4.16-kv. unit was almost ready for operation by the end of 1948. Transformer capacity was increased 700 kw. during 1948 and .3 mile of 2,400-volt primary was built. A total of 230 meters was added. During 1949 a second 12-kv. 2-mile circuit will be built to the new unit substation. Some additional load may be taken over in annexed territory. Sales increased 1,000,000 kwh. and 125 customers were added last year.—*V. W. Hannum, superintendent.*

Burbank P.S. Dept.

Capital expenditures this past year amounted to $1,100,000, as compared

Status of Western REA-Financed Systems

System	Cumulative Construction Loans 12-31-48	1948 Construction Loans	Miles Energ. 12-1-48	Consumers Connected 12-1-48
ARIZONA	**$10,810,786**	**$5,750,000**	**1,231†**	**6,178†**
Navopache Elec. Co-op., Lakeside	2,538,000	2,482,000	154†	841†
Sulphur Springs Valley Elec. Co-op., Willcox	2,178,000	700,000	347	2,250
Littlefield Elec. Co-op., Littlefield	20,000	.....	1†	12†
Graham County Elec. Co-op., Pima	2,155,500	1,346,000	217†	1,444†
Ma-Yu Elec. Co-op., Buckeye	790,000	.....	*	*
Trico Elec. Co-op., Tucson	1,502,000	902,000	139	154
Verde Elec. Co-op., Cottonwood	325,000	.....	100†	218†
Mohave Elec. Co-op., Kingman	310,000	.....	18	154
Duncan Valley Elec. Co-op., Duncan	750,000	320,000	22	574
Stonewall Elec. Co., Tucson	100,000†	.....	116†	200†
San Carlos Irrig. & Drainage Dist., Coolidge	142,286†	.....	117†	331†
CALIFORNIA	**$ 5,645,329**	**$2,515,000**	**1,775†**	**7,167†**
Imperial Irrig. Dist., Imperial	700,000	.....	700†	3,800†
Surprise Valley Electrif. Corp., Alturas	1,993,500	740,000	553	1,445
Plumas-Sierra Rural Elec. Co-op., Portola	827,000	185,000	350	948
Mountain Empire Elec. Co-op., Campo	417,000	190,000	169	894
Sacramento MUD, Sacramento	1,400,000	1,400,000	*	*
Mesa Elec. Co-op. Inc., Phelan	67,829†	.....	*	*
Klamath River Elec. Co-op., Hornbrook	240,000†	.....	3†	80†
COLORADO	**$28,889,551**	**$7,051,000**	**11,579†**	**35,718†**
Grand Valley Rural Power Lines, Grand Junction	779,000	83,000	367†	2,192†
San Luis Valley Rural Elec. Co-op., Monte Vista	1,449,000	.....	637	1,506
Morgan County Rural Elec. Assn., Fort Morgan	1,630,000	.....	805	1,689
Intermountain Rural Elec. Assn., Littleton	2,319,000	680,000	1,242	3,626
Southeast Colorado Power Assn., La Junta	2,270,810	197,000	1,550	4,281
Gunnison County Elec. Assn., Crested Butte	335,000	.....	123	531
Delta Montrose Rural Power Lines Assn., Delta	834,000	.....	631†	1,960†
Union Rural Elec. Assn., Brighton	1,745,000	575,000	673†	2,096†
San Isabel Elec. Assn., Pueblo	490,000	85,000	309	992
San Miguel Power Assn., Nucla	251,000	.....	210	835
Highline Elec. Assn., Holyoke	2,525,000	.....	1,201	2,415
Poudre Valley Rural Elec. Assn., Fort Collins	1,286,000	215,000	848	2,537
La Plata Elec. Assn., Durango	1,060,000	280,000	340	1,300
Empire Elec. Assn., Cortez	1,253,000	448,000	189†	2,300†
Holy Cross Elec. Assn., Glenwood Springs	730,000	.....	259	979
Sangre De Cristo Elec. Assn., Salida	917,000	463,000	231†	746†
Yampa Valley Elec. Assn., Steamboat Springs	996,000	.....	217†	619†
Mountain View Elec. Assn., Limon	2,725,000	450,000	1,500	2,490
Y-W Elec. Assn., Yuma	958,000	.....	16†	118†
K.C. Elec. Assn., Burlington	3,575,000	3,575,000	134†	1,621†
White River Elec. Assn., Meeker	658,000	.....	23	554
Monument Elec. Co., Trinidad	103,741	.....	74†	331†
IDAHO	**$ 8,665,295**	**$1,080,000**	**4,110†**	**10,579†**
Northern Idaho R. Elec. Rehab. Assn., Sandpoint	1,629,750	.....	789	1,956
Clearwater Valley L. & P. Assn., Lewiston	3,023,000	275,000	1,285	3,389
Kootenais Rural Elec. Assn., Coeur D'Alene	1,061,000	185,000	532†	1,843†
Idaho County L. & P. Co-op. Assn., Grangeville	733,500	150,000	350	758
Raft River Rural Elec. Co-op., Malta	406,000	.....	200	351
Fall River Rural Elec. Co-op., Ashton	1,075,000	350,000	400	953
Lost River Elec. Co-op., Mackay	379,000	120,000	224†	744†
Prairie Power Co-op., Fairfield	162,000	.....	165	165
Long Valley Power Co-op., Donnelly	196,045†	.....	165	420
MONTANA	**$23,909,298**	**$6,284,000**	**9,939†**	**20,586†**
Ravalli County Elec. Co-op., Corvallis	476,700	150,000	292	774
Sun River Elec. Co-op., Fairfield	1,610,500	.....	1,100	1,943
Lower Yellowstone Rural Elec. Assn., Sidney	1,011,600	615,000	327	753
Yellowstone Valley Elec. Co-op., Huntley	1,048,498	145,000	712	1,891
Vigilante Elec. Co-op., Dillon	1,455,000	100,000	754	1,441
Missoula Elec. Co-op., Missoula	945,000	450,000	315	621
Flathead Elec. Co-op., Kalispell	1,040,000	635,000	350	1,327
Fergus Elec. Co-op., Lewistown	1,953,000	10,000	1,037	1,575
Park Elec. Co-op., Livingston	900,000	175,000	466	925
Mid-Yellowstone Elec. Co-op., Hysham	385,000	.....	309	571
Beartooth Elec. Co-op., Red Lodge	1,162,000	160,000	761	1,364
Big Horn County Elec. Co-op., Lodge Grass	1,002,000	250,000	445	947
Big Flat Elec. Co-op., Turner	469,000	.....	229	307
Sheridan County Elec. Co-op., Westby	1,675,000	1,088,000	352	593
Northern Elec. Co-op., Opheim	1,355,000	700,000	236	340
Valley County Elec. Co-op., Glasgow	670,000	200,000	313†	343†
McCone County Elec. Co-op., Circle	786,000	11,000	177	663
Goldenwest Elec. Co-op., Wibaux	989,000	475,000	332	368
Glacier County Elec. Co-op., Cut Bank	881,000	.....	171	1,755
Marias River Elec. Co-op., Shelby	1,555,000	100,000	323	1,635
Hill County Elec. Co-op., Havre	1,775,000	255,000	938	650
Tongue River Elec. Co-op., Ashland	265,000	265,000	*	*
Southeast Elec. Co-op., Ekalaka	500,000	500,000	*	*
NEVADA	**$ 286,000**	**$**	**147**	**675**
Alamo Power Dist. No. 3, Alamo	69,000	.....	24	80
Overton Power Dist. No. 5, Overton	217,000	.....	123	595

System	Cumulative Construction Loans 12-31-48	1948 Construction Loans	Miles Energ. 12-1-48	Consumers Connected 12-1-48
NEW MEXICO	**$12,144,000**	**$2,855,000**	**4,288†**	**11,849†**
Central Valley Elec. Co-op., Artesia	1,086,000	300,000	333	1,302
Roosevelt County Elec. Co-op., Portales	1,382,000	175,000	759	1,786
Farmers' Elec. Co-op., Clovis	1,655,000	.....	1,358	2,278
Kit Carson Elec. Co-op., Taos	1,335,000	195,000	383†	2,177†
Otero County Elec. Co-op., Cloudcroft	1,116,000	400,000	316	956
Stonewall Elec. Co., Albuquerque	224,500	.....	338†	828†
Mora-San Miguel Elec. Co-op., Mora	828,000	80,000	189†	615†
Sierra Elec. Co-op., Hillsboro	235,000	.....	105	205
Springer Elec. Co-op., Springer	922,000	400,000	347	402
The Socorro Elec. Co-op., Socorro	678,000	270,000	160	1,300
Central New Mexico Elec. Co-op., Corona	707,000	.....	*	*
Continental Divide Elec. Co-op., Gallup	350,000	70,000	*	*
Lea County Elec. Co-op., Lovington	775,000	775,000	*	*
Columbus Elec. Co-op., Columbus	300,000	150,000	*	*
Southwestern Elec. Co-op., Clayton	550,000	.....	*	*
OREGON	**$15,224,684**	**$3,729,000**	**5,385†**	**18,686†**
Blachly-Lane County Co-op. Elec. Assn., Blachly	522,000	.....	198†	888†
Benton-Lincoln Elec. Co-op., Corvallis	2,430,000	525,000	1,191	3,416
Umatilla Elec. Co-op. Assn., Hermiston	513,000	.....	337	1,112
Malheur Co-op. Elec. Assn., Vale	580,000	205,000	336†	629†
Douglas Elec. Co-op., Roseburg	1,679,500	565,000	499	2,062
Lane County Elec. Co-op., Eugene	1,629,600	.....	571	3,182
Coos Elec. Co-op., Coquille	1,504,000	84,000	423†	2,213†
Northeast Clackamas County Elec. Co-op., Sandy	714,000	250,000	151	512
Tillamook PUD, Tillamook	300,000	105,000	57	170
Central Elec. Co-op., Redmond	1,236,000	740,000	428	1,185
Wasco Elec. Co-op., The Dalles	1,715,000	575,000	847	1,212
Columbia Basin Elec. Co-op., Heppner	860,000	150,000	*	*
West Oregon Elec. Co-op., Vernonia	1,199,000	430,000	343	2,014
Eastern Oregon Elec. Co-op. Assn., Pendleton	315,000	100,000	*	*
Jordan Valley Elec. Co-op., Jordan Valley	27,584‡	.....	4†	91†
UTAH	**$ 2,367,000**	**$ 220,000**	**1,076†**	**3,138†**
Garkane Power Assn., Richfield	971,000	200,000	408	1,490
Moon Lake Elec. Assn., Mt. Emmons	1,036,000	.....	500	1,401
Beaver Valley Elec. Assn., Beaver City	24,000	12,000	13†	45†
Escalante Valley Elec. Assn., Beryl	239,000	.....	93	119
Flowell Elec. Assn., Fillmore	34,000	3,000	28†	47†
Dixie Rural Elec. Assn., St. George	63,000	5,000	34†	36†
WASHINGTON	**$19,867,611**	**$3,718,000**	**8,647†**	**20,425†**
Benton Rural Elec. Assn., Prosser	2,019,500	900,000	650	1,960
Orcas P. & L. Co., Eastsound	1,122,000	.....	193	1,122
Mutual P. & L. Assn., North Bend	37,919	.....	15†	46†
PUD No. 1 of Klickitat County, Goldendale	2,045,000	400,000	111†	425†
Inland Empire Rural Elec., Spokane	3,290,000	465,000	2,752	5,229
Columbia County Rural Elec. Assn., Dayton	961,000	280,000	429	692
Quinault Light Co., Quinault	125,000		25†	220†
PUD No. 1, Chehalis	659,000		330†	1,817†
PUD No. 1 of Kittitas County, Ellensburg	246,000	.....	193	414
Stevens County Elec. Co-op., Colville	1,748,000	630,000	583	1,619
Chelan County Elec. Co-op., Leavenworth	106,000	.....	60	218
Okanogan County Elec. Co-op., Winthrop	170,000	.....	125	439
Pend Oreille Elec. Co-op., Newport	961,000	500,000	367†	754†
Big Bend Elec. Co-op., Ritzville	1,142,000	.....	850	770
Lincoln Elec. Co-op., Davenport	1,339,000	210,000	1,041	1,007
Nespelem Valley Elec. Co-op., Nespelem	351,000	.....	60	396
PUD No. 1 of Clallam County, Sequim	621,000	68,000	30	526
Ferry County PUD No. 1, Republic	710,000	200,000	128	431
PUD No. 1 of Douglas County, Bridgeport	854,000	.....	486	881
Mason County PUD No. 1, Shelton	170,000	65,000	7	27
Pend Oreille County PUD No. 1, Newport	230,000		3†	9†
PUD No. 1 of Okanogan County, Okanogan	400,000		*	*
PUD No. 1 of Cowlitz County, Longview	201,192‡		185†	680†
PUD No. 2 of Grant County, Ephrata	359,000‡		24†	743†
WYOMING	**$10,412,600**	**$1,947,000**	**4,276†**	**9,637†**
Riverton Valley Elec. Assn., Riverton	524,000	.....	443	833
Big Horn Rural Elec. Co., Basin	638,000	.....	443	1,205
Wyrulec Co., Lingle	1,154,600	330,000	550	1,417
Bridger Valley Elec. Assn., Mountain View	412,000	125,000	127	457
Wheatland Rural Electrif. Assn., Wheatland	470,000	.....	366†	635†
Lower Valley P. & L., Freedom	599,500		253	1,109
Garland L. & P. Co., Powell	195,300		95†	277†
Washakie Rural Elec. Co., Worland	56,500		74	203
Rural Elec. Co., Pine Bluffs	2,584,000	940,000	850†	1,424†
Hot Springs County Rural Elec. Assn., Thermopolis	365,000	.....	160†	368†
Carbon P. & L., Saratoga	914,000	157,000	280†	723†
Niobrara Elec. Assn., Lusk	421,000	.....	*	*
Shoshone River Power, Cody	415,000	95,000	229†	274†
Sheridan-Johnson Rural Elec. Assn., Sheridan	430,000	.....	154†	108†
Tri-County Rural Elec. Assn., Sundance	1,155,000	300,000	87	376
Sheridan Suburban Elec. Co., Sheridan	78,700‡	.....	165†	228†

* Not Energized † Estimate ‡ Loan Repaid

with a scheduled program of $2,500,000. The difference of $1,400,000 is accounted for by a full year's delay in our 20,000-kw. steam plant addition, and will carry over to the 1949 program, making the planned capital expenditures $2,300,000. Originally scheduled for October 1948, the present completion date set for this 20,000-kw. unit is August 1949. Manufacturers' slow delivery of equipment drawings needed for plant layout and design impeded progress during the early stages, and revised promised delivery date of the turbogenerator unit is limiting the present rate of progress. Need for this new capacity is critical inasmuch as system peak demand now exceeds 37,000 kw. and present capacity is but 25,100 kw. The deficiency is being supplied through purchase of excess capacity from adjacent municipal power systems.

Burbank's new 20,000-kva. Victory distributing station was placed in service in May of 1948, at an installed cost of $250,000. This is the third distributing station on our system. In addition to serving feeders for new load, it will afford relief for a number of overloaded feeders now served from the Burbank distributing station. A 25,000-kva. transformer bank is being installed at the Burbank distributing station to take the output of the new generating unit. Two 3,750-kva. transformer banks are also being installed at this time for station auxiliaries for this generating unit and for a future 20,000-kv. unit.

Reversed-cycle heating and cooling is but one of the special features of an administration and general office building now under construction for the joint use of the municipal water and electric utilities. Scheduled for occupancy on April 1, 1949, this half-million dollar building will provide 30,000 sq. ft. of critically needed office space.

A total of 190 distribution transformers with aggregate capacity of 5,710 kva. was added to the 4.3-kv. distribution system during the past year. Part of this capacity was for serving 2,166 new consumers and the rest for relief of overloaded transformers. Good progress has been made in the program to relieve overloaded distribution transformers. This program is now being retarded by the necessity of also replacing transformer poles, and in many cases the entire pole line including the replacement of secondaries with heavier conductors. A total of 770 poles was installed for new extensions and replacement of old poles. Pole line extensions amounted to 24,125 ft. Total lengths of primary and of secondary conductors installed were 71,600 ft. and 121,390 ft., respec-

tively. Approximately 25% of the pole lines scheduled for early replacement have been completed. In rebuilding these lines, the new standards being employed include: (1) 100-ft. pole spacing instead of the former standard of 150 ft. (2) Secondary conductors of 2/0 AWG instead of No. 4 or No. 6 wire. (3) Two paralleled transformers per block instead of a single transformer.

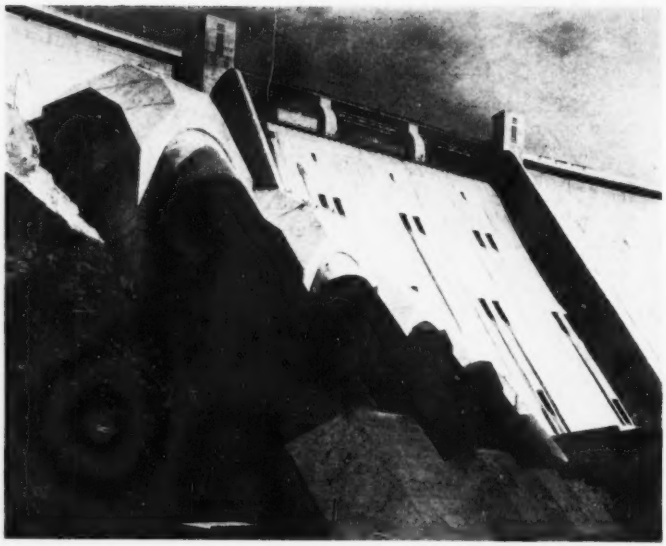
There has been a steady decline in aircraft manufacturing load since the end of the war and until June 1948, the decline has more than offset the gains made in other sales classifications. Since June, a leveling off of this decline and the continued increases in other sales classifications have produced net gains in system energy consumption, which is now running about 9% over the corresponding months of last year. While the transition point in system load occurred in June, the transition in system peak demand occurred six months earlier.

An unusual intercommunicating system installed in our steam-electric generating plant is of interest, particularly as this system, completed early in 1948, has proved highly successful. The intercommunicating system consists of 105 microphone input stations distributed throughout the entire plant and yard areas, 65 loud speakers similarly distributed, and an amplifier assembly with an output rating of 500 watts. Each operator on duty carries a specially designed cancellation microphone which may be plugged into any of the 105 microphone jacks, and all communications blanket the entire plant and yard areas through the 65 loud speakers connected in parallel. The ability of this system to operate in extremely noisy locations is well demonstrated when two operators, each standing at a boiler draft fan, carry on conversation above a noise level of 115 decibels. The main advantages offered by this system are that no time is lost in trying to locate an operator, the operator can be immediately summoned to a point of emergency and, while he is hastening to this point, he may be apprised of the situation or may receive instructions. It is believed that the effectiveness of quick, sure intercommunication during an emergency may be more valuable than the presence of an extra operator.—*James H. McCambridge, general manager.*

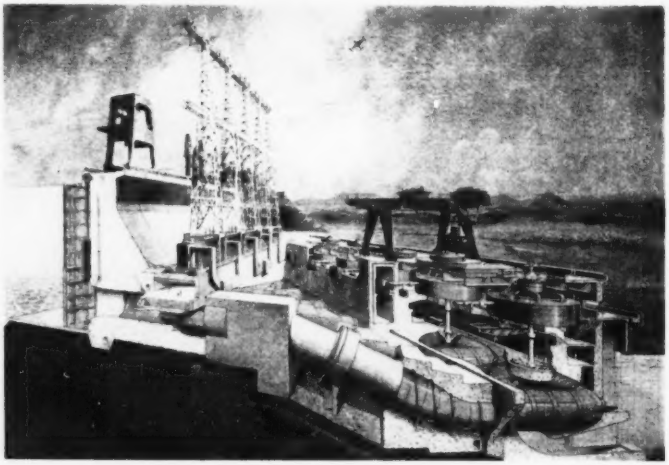
California Electric Power

California Electric Power Co. spent $4,822,300 for new and improved facilities in 1948 and has budgeted for 1949 the sum of $5,850,800.

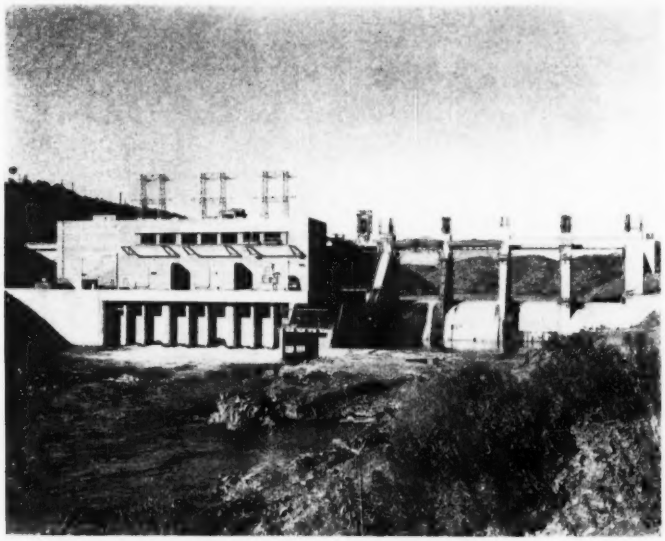
Major additions and betterments authorized during 1948 included: conversion of storage reservoir to an unattended station by the installation of remote control and equipment to transmit water level readings; installation of gas service line to steam generating plant; installation of supervisory control of switching equipment at important transmission line station; conversion of additional hydro generating station over to supervised basis of remote control; expansion of radio telephone coverage for transmission and distribution lines; construction of 69-kv. transmission line and related substations to serve as additional power supply into 33-kv. central district; construction of short section of 33-kv. transmission line into a substation serving a rapidly growing urban area; addition of automatic circuit reclosing features at many unattended substations; installation of induction and step voltage regulators at important urban and rural substations; improvement of bus and switching facilities at important substations; cutover of 2,400-volt distribution circuits to 4,300- and 12,000-volt operation; rebuilding and relocation of important distribution lines; addition of



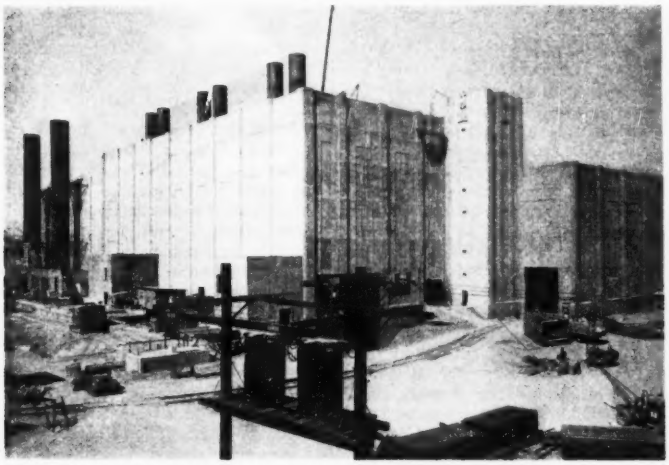
Addition of drum gates at Shasta Dam increases storage by 400,000 acre-feet



Cutaway view of Davis Dam and 225,000-kw. power plant to be completed 1951



75,000-kw. Keswick plant below Shasta will be completed by March of 1950



New units go in at Harbor steam plant of Los Angeles Dept. of Water & Power

capacitors; installation of new substations in congested areas, and construction of new primary distribution circuits to serve rapidly growing areas.

Transformer capacity added at substations was 42,400 kva. Two miles of 88-kv. and 28 miles of 69-kv. transmission; 23 miles of 33-kv. and 261 miles of line below 33-kv. were added during the year. Net increase in meters was 4,400.

Major additions and betterments budgeted for 1949 include: continuation of program of installing remote recording facilities at storage reservoirs; addition of water conservation and control features at reservoirs and diversions; addition of increased fuel oil storage facilities; extension of radiotelephone system to include distribution areas not now served; construction of 48 miles of 69-kv. transmission line; construction of a 33-kv. connection to outside power source; continuation of the program of installing automatic reclosing features at many unattended stations; modernization of important transmission substations; installation of induction and step voltage regulators at important urban and rural substations and increased regulator capacity at existing substations; improvements to bus and switching facilities at important substations; construction of additional circuits into congested distribution areas; addition of capacitors, and cut-over of distribution circuits to 4,800- and 12,000-volt operation.

Other anticipated additions include: 45,750 kva. in substation transformer capacity; 48 miles of 69-kv. transmission line; 37 miles of 12-kv. and 33-kv. lines, and 250 miles of distribution lines below 12 kv.

Anticipated load demand—130,000 kw. (16% increase over 1948); anticipated customer increase—3,925.—*R. H. Halpenny, chief engineer.*

California Pacific Utilities

A total of $550,000 was spent for new and improved facilities in 1948 and $1,000,000 has been budgeted for construction in 1949. Last year the company added 2,450 in substation transformer capacity and built 200 miles of distribution line 11 kv. and below. Meter increase was 1,400.

Additions in 1949 will include: five unit substations; 350 kva. of generating capacity; 9,625 kva. in substation transformer capacity; 85 miles of transmission line, 22 kv. and above; 200 miles of distribution, 11 kv. and below. It is anticipated that load will be increased by 3,000 kva. and that 1,200 customers will be added during the year.

Central Valley Project, USBR

Major construction activity on this project during the past year has been directed toward completion of canals and pumping plants for the irrigation systems. A contract for the installation of three 25,000-kva. generators for Keswick Dam power plant was awarded in October 1948, and specifications for the completion of Keswick Dam power plant and switchyard have been issued. It is now planned that installation of the two remaining 75,000-kw. generating units for Shasta Dam power plant will be completed in 1949. Construction of the 4,600-cfs. Tracy pumping plant, a key structure in the irrigation system, is under contract.

Construction of transmission lines from Shasta power plant to Shasta substation and Keswick power plant is to be completed early in 1949. Construction of 18.3 miles of the double-circuit, 230-kv. Elverta to Tracy transmission line, and stringing of the single-circuit, 230-kv. conductor from Oroville to Elverta is expected to be started this summer. The 69-kv. transmission line from the Contra Costa pumping plant

to the Clayton and Ygnacio pumping plants has been placed under contract.

Coast Counties G. & E.

Coast Counties Gas & Electric Co. expended more than $800,000 for additions to capacity and new business during 1948. This is expected to increase to $1,000,000 in 1949, most of which will be for new business extensions, the balance to be invested in at least six new substations.

Transmission lines completed in 1948 include 14 miles of 110 kv. from Morgan Hill to Watsonville, three miles of 60 kv. and six miles of 22 kv. A 110-60-22-kv. substation was completed at Green Valley (Watsonville) and placed in operation in July. Distribution lines added included 18 miles of 12 kv. and 85 miles of 4 kv.

In 1949 it is planned to add a total of 7,000 kva. in the transformer capacity of four substations. Also, three miles of 22-kv. transmission lines, ten miles of 12-kv. and 80 miles of 4-kv. distribution line are expected to be built.

It is estimated that 2,400 new electric customers will be added to our lines during 1949.—*F. S. Thomas, acting regional manager.*

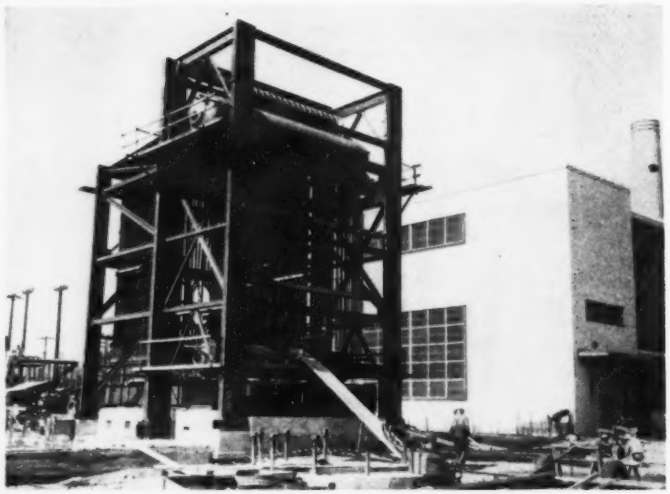
Glendale P. S. Dept.

Initiation of a new program of underground transmission and distribution lines was the outstanding feature of the 1948 construction activities of the Glendale Public Service Department in the power and light division. This was the first year of a program of such underground construction, which is planned to be continued indefinitely in order to relieve congestion on overhead pole lines on main thoroughfares.

By the end of the year there were installed 22,000 duct-ft. of 34.5-kv. transmission duct in 10,000 ft. of duct line. Three-conductor gas-filled cables were installed in these duct lines, and one 4,500-ft. section of line was placed in operation late in December. On the distribution end, 110,000 ft. of duct were installed in 15,000 ft. of duct-line.

For 1949 it is planned to complete that portion of the underground now commenced, installing the cable in the 4.1-kv. distribution duct lines, and putting all these lines into service. The contemplated program also calls for the installation of 67,000 duct-ft. of 4.1-kv. distribution duct in 12,000 ft. of duct-line.

The program of replacing the older of the overhead distribution lines which had passed their economic life was continued in 1948, and it is planned to continue this work in 1949.



Erecting boiler for unit 3 at steam plant of Burbank Public Service Dept.

Due to the shortage of materials and labor during the war period, this work was necessarily neglected with the result that the department has had to carry out an accelerated program to restore overhead lines to meet construction standards. Approximately five miles of new distribution lines were constructed. A new 12,000-kva. unit-type substation, ordered in 1947, is expected to be delivered and installed during 1949. In order to carry out the programs mentioned, as well as other miscellaneous work, there was allocated approximately $1,300,000 in the 1948-49 budget. This budget was approximately the same as the 1947-48 budget.

In addition to the projects described, the department received authorization to proceed with the design of a third 20,000-kw. unit of the steam generating station. A contract was executed for the turbine-generator, and delivery set for early in 1952. It is anticipated that during 1949 design will proceed, and contracts will be entered into for other major items of equipment.

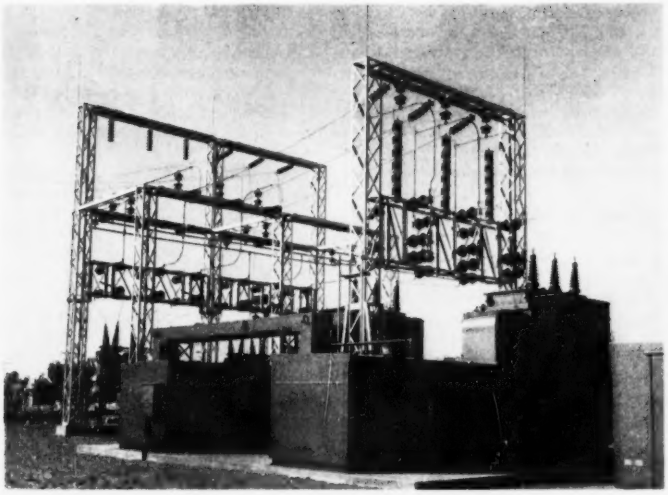
Glendale's load continued to increase during 1948. The peak demand was 34,300 kw., an increase of 4.5% over 1947, and the total energy consumed was 130,000,000 kwh., an increase of 5.75% over 1947. These increases occurred in spite of the somewhat limiting effect of daylight saving time. With the removal of daylight saving time, an increase of 10% in peak and energy consumption is expected for 1949. During 1948, 2,500 kva. of distribution transformer capacity were added to the system, an increase of 5.75%, and as evidence of the continuing growth of Glendale's population, 1,670 meters were added to the system, an increase of 5%.—*P. Diederich, general manager and chief engineer.*

Imperial Irrigation District

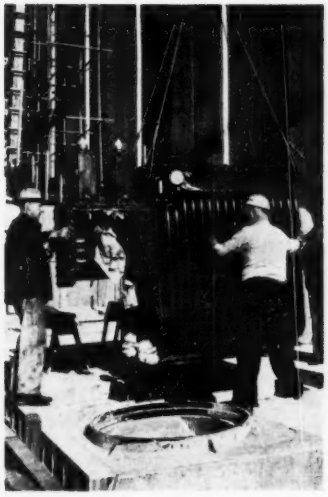
Approximately $3,800,000 was expended by Imperial Irrigation District during the year 1948, for additions and betterments to the generation, transmission and distribution plant. Similar expenditures for 1949 will amount to an estimated $3,000,000.

The installation of 20,000 kw. of steam-electric generating capacity at El Centro steam station is approximately 90% complete and it is anticipated that this unit will be on the line by the latter part of April 1949. The installation of 10,000 kw. of additional hydroelectric generating capacity at the Drop No. 4 plant on the All-American Canal is still in the manufacturing stage with delivery of the principal items of equipment scheduled for early next summer. This project probably will not be completed and ready for operation before the first quarter of 1950. No other additions to the generating plant are scheduled at this time, although there has been submitted to the California Districts Securities Commission for approval a power development project which would add another 33,000 kw. of capacity to the system.

Construction of 80 miles of 92-kv. primary transmission line between El Centro and Coachella was started on Dec. 15, 1948, and the line is expected to be in operation by June 1949. Con-



New 12,000-kva., 69/12.5-kv. substation of San Diego Gas & Electric Company



Sacramento underground transformer

struction of approximately 25 miles of 161-kv. transmission line between the Drop No. 4 hydro plant and El Centro probably will be started during the latter part of 1949, and there will also be installed at El Centro the first unit of a new central switching station for operation at 92 kv. The new transmission substation at Coachella was completed during 1948, and included an additional 10,000 kw. of transformer capacity. The installation of 37,500 kva. of transformer capacity in the Drop No. 4 transmission substation was not completed during 1948 because of manufacturing delays in the equipment. It is estimated that this project will be completed by June 1949. There was added to the system during 1948 approximately three miles of 34-kv. subtransmission line.

The distribution plant was increased by approximately 67 miles of 16.5-, 12-, and 4-kv. lines, and the addition of approximately 7,400-kva. in transformer capacity. It is estimated that approximately 80 miles of similar construction will be completed during 1949, and additional distribution transformer capacity probably will equal that installed during the past year.

The number of active meters was increased by 1,347 during 1948, and the estimated growth for next year contemplates the addition of approximately 1,400 meters to the system. Current estimates of the increased system demand during 1949 are 14.5%, and the system peak for that year is estimated at 60,000 kw.—*B. A. Weiss, executive engineer.*

Los Angeles Dept. of W. & P.

Construction expenditures in 1948 for the power system of the Department of Water & Power, for new and improved facilities were approximately $28,360,000 or more than double the 1947 figure. The 1949 program provides approximately $39,490,000 for new construction and improvement of existing facilities.

A 75,000-kw. steam-electric generating unit was placed in service in December 1948 at the Harbor steam plant. Another 75,000-kva. unit is practically complete. At receiving station F one 60,000-kva., 132-kv.-34.5-kv. transformer bank was placed in service and two 48,000-kva. synchronous condensers are nearing completion at this station. A 60,000-kva. frequency changer at receiving station C has been taken out of service due to the conversion of the Southern California Edison Co. to 60 cycles. This frequency changer is being disassembled and is being converted into two synchronous condensers. One condenser will remain at receiving station C and the other is being installed at receiving station D. Added capacity at other points on the system was: distribution stations, 66,450 kva.; industrial stations, 9,500 kva.; commercial stations, 21,890 kva.; and distribution lines, 53,350 kva.

A 2.4-mile 138-kv. underground transmission line connecting unit No. 4 at Harbor steam plant with receiving station C was placed in service. Distribution lines were added as follows: 34.5-kv. overhead, 3.9 miles; 4.8-kv. overhead, 109.0 miles; 34.5-kv. underground, 7.2 miles; and 4.8-kv underground, 27.0 miles. Meters in service showed a net increase during 1948 of approximately 46,000. The 1948 system generation peak was 759,000 kw. It is estimated that, had daylight saving time not been in effect, the peak would have reached approximately 815,000 kw.

At the Harbor steam plant, due to the delay in delivery of transformers, it was necessary to install a temporary transformer bank in order to place the 75,000-kw. unit in operation in December to meet the department's winter peak. This temporary bank was obtained by removing one spare 20,000-kva. transformer from each of three receiving stations. The transformers so removed have three windings: 132 kv., 34.5 kv. and 13.2 kv. The generated voltage at the Harbor plant is 13.8 kv. and the transmission voltage is 132 kv. so that it was possible to use two of the windings of these three-winding transformers to obtain the desired voltage. Each transformer weighed approximately 195,000 lb. and was transported from its associated receiving station to Harbor steam plant on the department's 100-ton trailer. The transformers were moved with all radiators intact, it being necessary to remove only the high-tension bushing. Another unusual installation completed in 1948 was the replacement of a gas-engine-driven generator station supplying local service light and power at Silver Lake switching station in the transmission lines between Hoover power plant and Los Angeles. This station is 57 miles from the nearest distribution line. Two 330-kva. 287-4.8-kv. station service transformers were

installed to replace the gas engine generator sets. It is believed that these are the highest voltage distribution transformers in service today.

1949 Program

Two 75,000-kw. steam units will be completed at the Harbor plant and placed in operation in February and June respectively. Underground transmission lines will be completed from Harbor plant to receiving station C, approximately 2.5 miles, one circuit to operate at 138 kv., the other at 34.5 kv. The latter circuit consists of three 3-phase cables. A new 60,000-kva., 132-34.5-kv. transformer bank will be installed at receiving station D. Other planned transformer capacity additions are: distribution stations, 118,000 kva.; industrial stations, 52,500 kva.; commercial stations, 15,000 kva., and distribution lines, 43,000 kva.

Distribution lines will include: 34.5 kv., 6.0 miles of overhead and 25.0 miles of underground; 4.8 kv., 96.0 miles of overhead and 30.0 miles of underground. On the basis of continuing standard time, the system generation peak for 1949 is estimated at approximately 855,000 kw. Customer increases are expected to be of the order of 35,000. Additional fuel oil storage and handling facilities will be installed at the Harbor steam plant and the Olympic tank farm. 132-kv. current limiting reactors will be installed at four receiving stations in order to limit short-circuit duties on the 132-kv. oil circuit breakers. A new control house will be built at receiving station F to handle the added facilities at this station. Carrier-current relay protection will be installed on all 132-kv. belt-line circuits which are not so equipped at the present time. Construction on the Owens Gorge project consisting of three 37,500-kw. plants will be continued and two of these plants are scheduled to be placed in operation in 1950.—*C. P. Garman, chief electrical engineer and deputy general manager.*

Modesto Irrigation District

Capital expenditures for 1948 were approximately $503,000 and they are anticipated to be $604,297 in 1949. Major plant additions during 1948 include: 30-point supervisory control system between stations A and J; carrier current telemetering from station J to station A and Don Pedro power house; a 40,000-kva. 69,000-volt regulating transformer having a range of 10% plus or minus has been placed in operation at station J, a 5,000-kva. bank of transformers 69,000 to 12,000 volts has been installed at station A.

During 1948 subnormal rainfall resulted in connecting 72 new agricultural pumping plants having a total of 1,890 hp. to provide water to supplement the deficiency in gravity irrigation water. Approximately 1,600 new services were connected to the system for a gain of 9% in consumers. In excess of 40 miles of 12- and 4-kv. distribution lines were constructed. Two underground vaults were constructed and 1,100 kva. of subway transformers installed in the downtown area. Three blocks of 12,000-volt underground circuits were installed to serve this load.

In 1949 major plant additions will consist of one 5,000-kva., 69,000- to 12,000-volt and one, 2,500-kva., 12,000- to 4,160-volt unit substations, three banks of 1,500-kva. transformers will be replaced with three 3,000-kva. banks to accommodate increased load at station B. The smaller banks will be placed in service at rural substations to provide capacity for increased rural power demands.

A second 69,000-volt single-circuit transmission line between station A and B two miles in length will be constructed. An additional 12,000-volt regulator will be installed at station A to regulate the 5,000-kva. transformer bank installed in 1948.

It is anticipated that customer growth will be approximately the same as in 1948. Considerable work will be done in 1949 in rebuilding and stringing larger conductors on our 12,000-volt distribution and subtransmission system. Outlying 4,000-volt lines are being converted to 12,000 volts as rapidly as possible to provide better voltage regulation for the present and anticipated future heavy rural power demands.—*C. E. Plummer, chief engineer.*

Pacific Gas and Electric

With the addition of a record total of 404,000 hp. of new generating capacity to the Pacific Gas and Electric system in 1948, and the announcement to build two large steam-electric generating plants, one at Moss Landing (on Monterey Bay) and the other in Contra Costa County, with a combined capacity of 804,000 hp., this company forges ahead with its construction program to match California's unprecedented growth during the postwar years and to provide adequate power for future needs.

Current and Future Power Development on Bureau of Reclamation Projects

Project	State	River	Purpose	Name of Plant	Year Initial Operation	Initial kw.	Present No. of Units	Ultimate kw.	Ultimate No. of Units
Boise	Idaho	So. Fork Boise	F.C., Irr., P.	Anderson Ranch	1950	27,000(2)	2	40,500(3)	3
Boulder Canyon	Ariz.-Nev.	Colorado	F.C., Irr., P.	Hoover	1936	1,034,800(4)	15(5)	1,322,300	19(6)
Central Valley	California	Sacramento	F.C., Irr., P.	Keswick	1949	75,000(7)	3	75,000	3
Central Valley	California	Sacramento	F.C., Irr., P.	Shasta	1944	229,000(4)	7(8)	379,000	7(9)
Colo.-Big Thompson	Colorado	Power Conduit No. 1A	Irr., P.	Estes	1950	45,000(10)	3	45,000	3
Colo.-Big Thompson	Colorado	Power Conduit No. 1	Irr., P.	Marys Lake	1950	8,100	1	8,100	1
Colo.-Big Thompson	Colorado	Power Conduits	Irr., P.	Six plants	Indefinite	(11)	(11)	101,200(11)	(11)
Columbia Basin	Washington	Columbia	F.C., Irr., P.	Grand Coulee	1941	776,000(4)	12(12)	1,974,000	21(13)
Davis Dam	Ariz.-Nev.	Colorado	F.C., Irr., P.	Davis	1950	225,000(14)	5	225,000	5
Hungry Horse	Montana	So. Fork Flathead	F.C., Irr., P.	Hungry Horse	Indefinite	(11)	(11)	300,000(11)	(11)
Missouri Basin	Wyoming	Big Horn	F.C., Irr., P., Silt	Bovsen	1951	15,000(15)	2	15,000	2
Missouri Basin	Montana	Missouri	F.C., Irr., P.	Canyon Ferry	Indefinite	36,000(16)	3	36,000	3
Missouri Basin	N. Dakota	Souris Canal	Irr.	Crosby	Indefinite	(11)	(11)	72,000(11)	(11)
Missouri Basin	N. Dakota	Souris Canal	Irr.	Des Lacs	Indefinite	(11)	(11)	72,000(11)	(11)
Missouri Basin	Wyoming	North Platte	F.C., Irr., P., Silt	Glendo	Indefinite	(11)	(11)	15,000(11)	(11)
Missouri Basin	Wyoming	North Platte	P.	Kortes	1950	36,000(16)	3	36,000	3
Missouri Basin	S. Dakota	James R. Extension Canal	Irr.	Miller	Indefinite	(11)	(11)	144,000(11)	(11)
Missouri Basin	Montana	Big Horn	Irr., P.	Yellowtail	Indefinite	(11)	(11)	125,000	4(17)
Palisades	Idaho	Snake	F.C., Irr., P.	Palisades	Indefinite	36,000(18)	2(11)	54,000	3(11)
Shoshone	Wyoming	Shoshone	P.	Heart Mountain	1948	(11) 5,000	1	(11) 5,000	1

(1) F.C. = Flood Control; Irr. = Irrigation; P = Power; Silt = Silt Control
(2) 2—13,500 kw.
(3) 3—13,500 kw.
(4) As of Dec. 31, 1948.
(5) 12—82,500 kw., 1—40,000 kw., 2—2,400 kw.
(6) 15—82,500 kw., 2—40,000 kw., 2—2,400 kw.
(7) 3—25,000 kw.
(8) 5—75,000 kw., 2—2,000 kw.
(9) 5—75,000 kw., 2—2,000 kw.
(10) 3—15,000 kw.
(11) Design not definitely decided
(12) 10—108,000 kw., 2—10,000 kw.
(13) 18—108,000 kw., 3—10,000 kw.
(14) 5—45,000 kw.
(15) 2—7,500 kw.
(16) 3—12,000 kw.
(17) 4—31,250 kw.
(18) 2—18,000 kw.
(19) 3—18,000 kw.

The system peak for 1948 reached 2,078,900 kw., an increase of 9% over the 1947 peak. Total expenditures for electrical construction in 1948 amounted to some $131,000,000, as compared with $80,000,000 in 1947 and an estimated total of $135,000,000 for 1949. These figures aid in gaining a perspective of the current accelerated growth of population in the state and of the increase in load in the territory served by the utility. The company's $500,000,000 postwar expansion program will add nearly 2,000,000 hp. to the generating capacity of the system by the end of 1951, aggregating at that time a total in excess of 4,000,000 hp.

Generation

In the steam-electric generating division, the first unit of 75,000 kva. for the new Kern steam plant was placed in operation in May 1948. The second unit of 115,000 kva. is expected to be brought on the line during the latter part of this year or early 1950. The estimated plant cost is $29,700,000. The first of two 100,000-kw. turbogenerators at the extension to station P, San Francisco, was placed in operation during December 1948, with the second unit scheduled for completion early this year. Each of the generators for the extension to this plant is rated 115,000 kva. The completed cost of the new capacity will approximate $23,700,000.

During the fall of 1948, construction was started on the new Moss Landing steam plant which will provide an additional 359,375 kva. This installation will consist of three 100,000-kw. turbogenerators, two rated at 115,000 kva. each, and a third at 129,375 kva. The total plant cost is estimated at $51,500,000 with the first unit scheduled for operation in the spring of 1950, and the remaining two units early in 1951. The second of the two new steam plants, Contra Costa, will be similar to that at Moss Landing in that it also will be a three 100,000-kw. unit installation. The Contra Costa units are rated at 129,375 kva. each. This project currently is in the early design stage, with construction scheduled to begin in April of this year and with completion expected during 1951. The cost here also is estimated at $51,500,000.

The company's extensive hydroelectric construction program progressed rapidly during the past year. The replacement of the 47-year-old Electra plant on the Mokelumne River was completed during the summer, adding 99,000 kva. through three 33,000-kva. impulse wheel driven generators, at a cost of approximately $20,800,000. The old plant, rated at 20,000 kva., is still in service but will be retired at some later date. About eleven miles upstream from Electra, the new West Point power house was placed on the line in November of 1948. With expenditures totaling about $5,250,000, this plant adds 16,000 kva. to the system.

The two large hydroelectric projects on the North Fork of the Feather River are well under way. The upper of these at Rock Creek, approximately one mile below the present Bucks Creek plant, requires 34,500 ft. of 25-ft., horseshoe-shaped, pressure tunnel and 1,050 ft. of penstock. The installation will consist of two, 73,500-hp., vertical, Francis-type turbines, each driving a 63,000-kva. generator. The cost is estimated at $35,400,000, with operation scheduled for the early part of 1950.

Seven miles downstream from the Rock Creek plant, the Cresta project, also a two-unit installation, will have a peak flow of 3,500 c.f.s. through 21,000 ft. of 26-ft., horseshoe-shaped, pressure tunnel. Each of two 46,500-hp., vertical, Francis-type turbines will drive a 37,500-kva. generator. This plant is scheduled to be brought in during the winter of 1949. The cost will approximate $26,400,000.

Work was started during the past year on the replacement of the old Colgate plant on the Yuba River, after 49 years of continuous service. The seven old units, with a total capacity of 15,575 kva., will be replaced by a single 35,000-hp. turbine connected to a 30,000-kva. generator. The estimated cost for this plant is $3,325,000 with operation scheduled for the summer of this year.

Transmission

In the past year, approximately 591,000 kva. of transmission substation transformer capacity was installed throughout the company's system. It is anticipated that in 1949 close to 775,000 kva. more will be added. Each of these figures represents combined capacity installed at 220/110-kv. and 110/60-kv. substations.

During the year 1948, approximately 450 miles of transmission lines

Current and Future Transmission Lines on Bureau of Reclamation Projects

Project	State	Designation of Line	Voltage in kv.
Boise	Idaho	Anderson Ranch to Mountain Home	115
Boise	Idaho	"C" Line pumping plant to Black Canyon power plant	69
Boulder Canyon	Nev.	Nevada State switchyard to Boulder City substation	69
Central Valley	Calif.	Contra Costa substation to Clayton and Ygnacio pumping plants	69
Central Valley	Calif.	Shasta to Keswick	13.8
Central Valley	Calif.	Oroville to Elverta to Tracy	230
Central Valley	Calif.	Keswick to Elverta to Tracy	115
Central Valley	Calif.	Tracy to Contra Costa	69
Central Valley	Calif.	Keswick Tapline (2)	230
Central Valley	Calif.	Shasta to Cottonwood, Gas Pt. Rd. (2) and Shasta sub-connection	230
Colorado-Big Thompson	Colo.	Flatiron to Greeley	115
Colorado-Big Thompson	Colo.	Brush to Akron to Yuma	69
Colorado-Big Thompson	Colo.	Greeley to Brighton	115
Colorado-Big Thompson	Colo.	Loveland to Longmont	69
Colorado-Big Thompson	Colo.	Estes to Marys Lake and Estes to Granby	115
Davis Dam	Ariz.	Davis to Parker	230
Davis Dam	Ariz.	Davis to Prescott	230
Davis Dam	Ariz.	Tucson to Cochise	115
Davis Dam	Ariz.	2nd Phoenix to Tucson	115
Davis Dam	Ariz.	1st Phoenix to Tucson (overhead gnd. wire only)	115
Davis Dam	Ariz.	Prescott to Phoenix	230
Davis Dam	Ariz.	Phoenix to Mesa (double circuit)	115
Davis Dam	Ariz.	2nd Parker to Gila	161
Davis Dam	Ariz.	Extensions to Yuma system	34.5
Davis Dam	Ariz.	Coolidge to E.D. No. 5 crosstie	115
Davis Dam	Ariz.	Mesa substation to Coolidge	115
Davis Dam	Ariz.	Davis to Hoover	230
Fort Peck	Mont.	Fort Peck to Williston	115
Fort Peck	Mont.	Glendive to Miles City	115
Fort Peck	Mont.	Havre to Shelby	115
Gila	Ariz.	Gila-Welton-Mohawk pumping power supply	34.5
Kendrick	Wyo.	Seminoe to Casper to Kortes	115
Kendrick	Wyo.	Medicine Bow to Sinclair to Hanna	34.5
Kendrick	Wyo.	Casper to Thermopolis	69
Missouri Basin	Mont.	Williston to Garrison	115
Missouri Basin	Nebr.	Gering to Northport to Sidney	115
Missouri Basin	Colo.-Nebr.	Sterling to North Platte	115
Missouri Basin	Nebr.-S. Dak.	Gering to Hot Springs	115
Missouri Basin	Wyo.-Colo.	Cheyenne to Sterling	115
Missouri Basin	Wyo.-Nebr.	Casper to Gering	115
Missouri Basin	S. Dak.-Nebr.	Fort Randall to O'Neill	115
Missouri Basin	Wyo.	Glendo to Lusk	115
Missouri Basin	Wyo.	Garland to Lovell	69
Missouri Basin	Wyo.-Mont.	Lovell to Yellowtail	115
Missouri Basin	Wyo.	Boysen to Thermopolis	69
Missouri Basin	N. Dak.	Bismarck to DeVaul	69
Rio Grande	N. Mex.	Elephant Butte to Socorro	115
Rio Grande	N. Mex.	Socorro to Albuquerque	115
Shoshone	Wash.	Heart Mountain to Garland	69
Yakima	Wyo.	Roza Div. pumping power supply	34.5

of higher than 50 kv. were constructed. A major line, 202 miles in length, at 220 kv., was completed from Tesla substation, near Tracy, to Midway substation, near Buttonwillow, at an approximate cost of $4,750,000. A 220-kv. circuit, with a total length of 192 miles, from Shasta substation to Vaca-Dixon substation (142 miles) and between Vaca-Dixon and Moraga substations (52 miles), was strung in a spare position on existing towers. The cost approximated $1,620,000.

In the Midway-Kern steam plant area, 34 miles of 110-kv. line and 24 miles of 70-kv. line were constructed as a system tie. Also in this area, 14 miles of 110-kv. line were installed between the Southern California Edison Co.'s Magunden substation and Kern steam plant.

In the northern end of the system, a 115-mile, 110-kv. line was completed between Shasta and Humboldt substations, near Eureka, providing an additional power supply into the Eureka area at a cost of approximately $3,000,000.

For the current year, it is anticipated that 300 miles of transmission lines higher than 50 kv. will be constructed, the majority being 110 kv. and 60 kv. Among these will be a 110-kv. line, 29 miles in length, extending from Drum power house to the Sierra Pacific Power Co.'s facilities at Summit. To provide additional power into the Ukiah and Willits areas, a 60-kv. wood pole line, 35 miles long, will be built between Hopland and Willits substations at a cost of some $410,000.

The output of the second unit at Kern steam plant will be handled by two additional 110-kv. circuits, from Kern to Midway substation, a distance of 21 miles. The cost is estimated at $610,000.

In order to provide additional line capacity for the two Feather River projects presently under construction, a 30-mile, 220-kv., single-circuit tower line is planned. This circuit will extend from Bucks Creek power house to Oroville. From Oroville southward to Bellota substation, 110 miles of 220-kv. circuit will be strung in a spare position on existing towers. The combined cost of the 30-mile tower line and the second Oroville-Bellota circuit will approximate $1,836,000.

Two legs of the 110-kv., underground transmission cable triangle between San Francisco station P, Mission substation, and station H were completed during the past year. These comprised two four-mile circuits between stations P and H, and the one four-mile circuit between Mission substation and station P. The remaining six of the 18 circuit miles is nearing completion at the present time. The installation is of the gas pressure type, consisting of three, single-conductor, 1,000-MGM, paper-insulated cables in somastic-coated steel pipe. Gas pressure at 200 psi. is maintained by regulating equipment at each terminal. When completed, the project will have cost an estimated $2,865,000.

To keep abreast with the company's increased generating and transmitting capacity, several transmission substations were placed in operation during 1948. Of these, the largest is the 220/110-kv., 180,000-kva. Moraga substation in Contra Costa County. This station, which was built at a cost of $3,700,000, is supplied from the north through Vaca-Dixon substation. At the southern end of the system, the installation of the first of two 75,000-kva. transformer banks at another 220/110-kv. outlet, Midway substation, was completed during the past year. The second bank is scheduled for operation during the current year. The cost of the completed substation will approximate $3,400,000. An additional outlet for power in the Stockton area, the 110/60-kv. Lockeford substation, was placed in service during December 1948. The bank at this station is rated at 45,000 kva. Construction also was completed on the new Tesla 220-kv. switching station, near Tracy.

For the present year, twelve transmission substations are scheduled for operation: four 220/110-kv. stations with a total capacity of 415,000 kva., and eight 110/60-kv. outlets with a combined capacity of 360,000 kva.

Distribution

During December 1948, Mission substation, located at Eighth and Mission streets in downtown San Francisco, was placed in operation. This important 110/12-kv. station is the terminus of the 110-kv. underground cables mentioned above, and will (1) make possible the transmission of large blocks of power (170,000 kva. ultimately) at 110 kv. to a point near the load center in the heart of San Francisco, (2) supply additional power at 12 kv. to the subtransmission network feeding the city, and (3) supply distribution networks and radial feeders to loads at 12 kv. The station cost will approximate $4,800,000.

It is expected that late this year the expansion and modernization of the distribution facilities at the station C Oakland steam-electric generating plant will have been completed. This work will increase the station distribution feeder capacity by 60,000 kva., at an outlay of some $680,000.

A third substation, to supply an additional 9,000 kva. at 12 kv. to the University of California in Berkeley, is scheduled for operation during the summer. It is estimated that this installation, known as University substation, together with increased feeder capacity at neighboring substations, will cost $350,000 approximately.

In addition to Mission substation, numerous distribution substations, representing several hundred thousand kva. of distribution capacity, were added to the company's system during 1948. The installation of a comparable total is in view for 1949.

During 1948 more than 72,000 electric customers were added throughout the system. For 1949 it is anticipated that approximately 70,000 new customers will be connected.

Distribution lines totaling 2,600 line miles were constructed during 1948, with nearly 3,500 line miles in prospect for 1949. Almost all of this mileage is in rural and suburban areas.—*I. S. Steele, vice-president and chief engineer.*

City of Palo Alto

During 1948 the city of Palo Alto spent between $150,000 and $200,000 to care for load growth and for system modernization. The program will be continued in 1949 with about the same expenditure of money. A new substation is being added with eight automatic feeders, supplied by a bank of three 2,500-kva. PG and E transformers.

In 1948 five miles of distribution line were built; 360 kva. of distribution capacitors were installed; two miles of street lighting were completed. During the year 875 meters were added, bringing the total to 8,890. Load peak was 7,400 kw. in 1947, 8,000 kw. in 1948.—*C. G. Smith, electrical engineer.*

Pasadena L. & P. Dept.

During the fiscal year 1947-48 the department experienced another record year. Energy sold in Pasadena exceeded the previous year by 15.1%. Total operating expense increased 22.1%. Additions to capital amounted to $1,744,247. This will be increased during the current year because of delays in delivery of material and equipment on order.

Work during 1948 included retubing and replacing of refractory in two of the larger boilers at the steam plant. Betterments to distribution system consisted mainly of construction of a new switching station and minor rebuilding of pole lines. Added distribution transformers in service in-

Springville, an important new 220-kv. substation installed by Southern California Edison Co. in San Joaquin Valley

Calender of New Generation

1948—Completed

Date	Size	Plant	Agency
Feb. 12	108,000 kw. (H)	Grand Coulee	USBR
Feb. 23	66,000 kw. (S)	Redondo	So. Calif. Ed.
March 5	75,000 kw. (H)	Shasta	USBR
April 5	66,000 kw. (S)	Redondo	So. Calif. Ed.
April 23	108,000 kw. (H)	Grand Coulee	USBR
April 28	35,000 kw. (H)	Big Creek 3	So. Calif. Ed.
April	5,000 kw. (S)	Grand Junction	Pub. Ser. of Colo.
May 1	7,200 kw. (H)	Malad	Idaho Power
May 24	50 000 kw. (S)	Silver Gate	San Diego G. & E.
May	75,000 kw. (S)	Kern	P.G. and E.
July 21	75,000 kw. (H)	Shasta	USBR
July	99,000 kw. (H)	Electra	P.G. and E.
Sept.	35,000 kw. (S)	Lacombe	Pub. Ser. of Colo.
Oct. 1	13,500 kw. (H)	Malad	Idaho Power
Oct. 23	45,000 kw. (H)	Bridge River	B. C. Elec.
Nov.	16,000 kw. (H)	West Point	P.G. and E.
Dec. 6	75,000 kw. (S)	Harbor	L. A. Dept. of W. & P.
Dec. 8	5,000 kw. (H)	Heart Mt.	USBR
Dec. 15	111,000 kw. (S)	Sta. P. S. F.	P.G. and E.
Dec.	56,000 kw. (H)	Kerr	Mont. Power Co.
Total	1,125,700		

1949—Planned

Date	Size	Plant	Agency
Jan. 1	20,000 kw. (S)	El Centro	Imperial Irrig Dist.
Feb.	111,000 kw. (S)	Sta. P. S. F.	P.G. and E.
Feb.	75,000 kw. (S)	Harbor	L. A. Dept. of W. & P.
March 1	75,000 kw. (H)	Shasta	USBR
March 1	15,000 kw. (H)	Lower Salmon	Idaho Power
March	45,000 kw. (H)	Bridge River	B. C. Elec.
March	15,000 kw. (S)	Pueblo	So. Colo. Power
March	75,000 kw. (S)	Harbor	L. A. Dept. of W. & P.
May	108,000 kw. (H)	Grand Coulee	USBR
May 1	15,000 kw. (H)	Lower Salmon	Idaho Power
June 1	11,500 kw. (S)	Tucson	Tucson G. E. L. & P.
June	75,000 kw. (S)	Harbor	L. A. Dept. of W. & P.
July 1	7,500 kw. (S)	Tempe	Salt River Valley Users
July	108,000 kw. (H)	Grand Coulee	USBR
July	30,000 kw. (H)	Colgate	P.G. and E.
July	20,000 kw. (S)	Burbank	Burbank P.S. Dept.
July	7,500 kw. (H)	Leaburg	Eugene Water Bd.
Aug. 1	15,000 kw. (H)	Lower Salmon	Idaho Power
Aug.	44,000 kw. (S)	Pasadena	Pasa. L. & P. Dept.
Sept. 1	15,000 kw. (H)	Lower Salmon	Idaho Power
Sept.	66,000 kw. (S)	Redondo	So. Calif. Ed.
Oct.	108,000 kw. (H)	Grand Coulee	USBR
Oct.	12,000 kw. (H)	Kortes	USBR
Oct.	66,000 kw. (S)	Redondo	So. Calif. Ed.
Oct.	45,000 kw. (H)	Bridge River	B. C. Elec.
Oct.	10,000 kw. (S)	Colorado Springs	Colo. Spr. PU Dept.
Oct.	8,000 kw. (H)	Walterville	Eugene Water Bd.
Oct.	27,000 kw. (H)	Umpqua	Calif. Ore. Power
Oct.	13,500 kw. (S)	Steam Plant	Eugene Water Bd.
Nov. 1	23,000 kw. (H)	Bliss	Idaho Power
Nov.	50,000 kw. (H)	Merwin	Pacific P. & L.
Nov.	75,000 kw. (H)	Cresta	P.G. and E.
Nov.	25,000 kw. (H)	Keswick	USBR
Dec. 15	23,000 kw. (H)	Bliss	Idaho Power
Dec.	75,000 kw. (S)	Harbor	L. A. Dept. of W. & P.
Total	1,514,000		

1950—Planned

Date	Size	Plant	Agency
Jan.	23,000 kw. (H)	Keswick	USBR
Jan.	12,000 kw. (H)	Kortes	USBR
Feb. 1	23,000 kw. (H)	Bliss	Idaho Power
Feb.	100,000 kw. (S)	Kern	P.G. and E.
March	25,000 kw. (H)	Keswick	USBR
Spring	100,000 kw. (S)	Moss Landing	P.G. and E.
May	8,100 kw. (H)	Marys Lake	USBR
May	15,000 kw. (H)	Estes	USBR
May	108,000 kw. (H)	Grand Coulee	USBR
June	126,000 kw. (H)	Rock Creek	P.G. and E.
June	45,000 kw. (H)	Davis Dam	USBR
July	12,000 kw. (H)	Kortes	USBR
July	27,000 kw. (H)	Anderson Ranch	USBR
July	15,000 kw. (H)	Estes	USBR
Aug.	40,000 kw. (S)	Orem	Utah P. & L.
Aug.	108,000 kw. (H)	Grand Coulee	USBR
Sept.	15,000 kw. (H)	Estes	USBR
Oct. 1	50,000 kw. (S)	Silver Gate	San Diego G. & E.
Oct.	45,000 kw. (H)	Davis Dam	USBR
Nov.	108,000 kw. (H)	Grand Coulee	USBR
Nov.	40,000 kw. (S)	Arapahoe	Pub. Ser. of Colo.
Nov.	40,000 kw. (S)	Honolulu	Hawaiian Elec.
Dec.	75,000 kw. (H)	Owens Gorge	L. A. Dept. of W. & P.

1951—Planned

Date	Size	Plant	Agency
Jan.	45,000 kw. (H)	Davis Dam	USBR
Jan.	10,000 kw. (H)	Drop 4	Imperial Irrig Dist.
April	45,000 kw. (H)	Davis Dam	USBR
April	108,000 kw. (H)	Grand Coulee	USBR
Spring	200,000 kw. (S)	Moss Landing	P.G. and E.
June	45,000 kw. (H)	Davis Dam	USBR
June	60,000 kw. (S)	Jordan	Utah P. & L.
June	37,500 kw. (H)	Owens Gorge	L. A. Dept. of W. & P.
July	108,000 kw. (H)	Grand Coulee	USBR
Summer	300,000 kw. (S)	Contra Costa	P.G. and E.
Aug.	100,000 kw. (S)	Moss Landing	P.G. and E.
Oct.	108,000 kw. (H)	Grand Coulee	USBR
Nov.	40,000 kw. (S)	Arapahoe	Pub. Ser. of Colo.
Nov.	82,500 kw. (H)	Hoover Dam	USBR
Dec.	84,000 kw. (H)	Big Creek 4	So. Calif. Ed.

1952—Planned

Date	Size	Plant	Agency
Jan.	40,000 kw. (H)	Gorge	Seattle City Light
Jan.	82,500 kw. (H)	Hoover Dam	USBR
June	71,250 kw. (H)	Hungry Horse	USBR
July	30,000 kw. (H)	Boysen	USBR
Oct.	71,250 kw. (H)	Hungry Horse	USBR
Oct.	20,000 kw. (S)	Glendale	Glendale P.S. Dept.
Oct.	112 500 kw. (H)	Owens Gorge	L. A. Dept. of W. & P.

1953—Planned

Date	Size	Plant	Agency
Feb.	50,000 kw. (H)	Detroit	Army Engrs.
Feb.	71,250 kw. (H)	Hungry Horse	USBR
June	71,250 kw. (H)	Hungry Horse	USBR
July	65,000 kw. (H)	Ice Harbor	Army Engrs.
Aug.	270,000 kw. (H)	Ross	Seattle City Light
Sept.	50,000 kw. (H)	Detroit	Army Engrs.
Dec.	140,000 kw. (H)	McNary	Army Engrs.
Dec.	60,000 kw. (S)	Undetermined	L. A. Dept. of W. & P.

1954—Planned

Date	Size	Plant	Agency
Jan.	65,000 kw. (H)	Ice Harbor	Army Engrs.
July	65,000 kw. (H)	Ice Harbor	Army Engrs.
Nov.	70,000 kw. (H)	McNary	Army Engrs.

creased total capacity from 61,239 to 65,000 kva. The number of meters increased from 35,443 to 36,598 in the year.

The 44,000-kw. addition to the steam power plant is nearing completion. Delay in delivery of the main turbine-generator unit will postpone preliminary tests until August 1949.

Two 3,000-kva. unit substations will be installed to relieve local conditions before next winter. We estimate the kwh. load and system demand during the next year will increase approximately 10%. The years 1950 and 1951 will bring further expansion of substation and distribution capacities, and additional steam plant capacity will be required in 1951.

As is evident in the above brief summary, we are faced with practically the same type of problems experienced by other utilities on the West Coast. Possible new annexations to the city of Pasadena may require an acceleration of our construction program. We do not see any indication of drop off in load during the next several years.—*E. L. Bettannier, general manager and chief engineer.*

Riverside E. L. & W. Dept.

During the year 1948 approximately $301,000 was expended in plant improvements and additions, being somewhat less than was tentatively planned principally because of the shortage in construction personnel experienced in the department in the early part of the year and in part by some material shortages. The program for 1949 in the over-all picture indicates that construction expenditures will be approximately $400,000, with every indication of a continuation at this level for several years in the future.

Transformer capacity of the Arlington receiving station, the point of energy supply from the California Electric Power Co., was increased to 6,000 kva., doubling the former capacity of the station. Transformers are the property of the serving company, California Electric Power Co.

Extensions during the year totaled 8.67 miles, being slightly in excess of the contemplated mileage, to some extent caused by increased developments in areas within the city which possibly may be termed "rural areas." System growth as indicated by net changes in meters installed, with a gain of 864, exceeds slightly the net gain of the year 1947, with total meters in service at the close of the year being 16,029.

Planning of major importance for 1949 includes work to start on the addition of three unit substations which will possibly total 10,000-kva. capacity and will require the construction of approximately nine miles of interconnecting 34.5-kv. transmission lines. This work will be started in 1949 but completion is not expected until sometime in 1951. The continued general load development and increased area density indicates that approximately ten miles of distribution lines will be constructed during the year.

As load growth was viewed at the beginning of the year 1948, it was anticipated that system peak would reach 14,500 kw., which projection was exceeded with a peak in excess of 15,000 kw. With present average yearly consumption by domestic consumers exceeding 1,700 kwh. and the contemplated net gain in meters possibly exceeding that of 1948, added to the known increases developing in commercial and industrial service, the 1949 increase in peak may equal that of last year.

The department continues with the virtually free installation program for electric ranges and water heaters, believing that it is an obligation of the utility by reason of early development in a long-range program, resulting in a rather low average unit cost for such installations.—*L. W. Grayson, superintendent.*

Sacramento MUD

1948 was a year of unprecedented activity in electric distribution work in the Sacramento area. $2,350,000 was added in new distribution plant: 6,550 new meters were added to make a total of 77,500 meters in use at year's end; 2,000 new distribution transformers were placed; 100 miles of new line were built; 6,000 kva. of static capacitors were added to rural and urban feeders to complete a program for maintaining average power factor on feeders above 90%, and five new 22/4-kv. unit-type substations were added to the system.

Good experience was had in converting 50 miles of rural distribution lines from 4-kv. to 12-kv. distribution. All extensions in rural areas are now being made at 12 kv. or are being trimmed for 12 kv. to facilitate later conversion. Coupled with this program of conversion is added attention to fuse coordination on long rural feeders. In the city of Sacramento itself, the first two feeders for a 12-kv. fed underground secondary network were placed in existing ducts. This new high-voltage underground distribution system will supplement, and in the distant future will replace, the existing and heavily loaded 4-kv. radial underground system.

A total of $2,500,000 is budgeted for additions and betterments in 1949; 6,000 new customers are expected; conversion of 4-kv. rural lines to 12 kv. will continue; 20 miles of 22-kv. rural subtransmission will be converted for 60-kv. operation; three 3,000-kva. 60/12-kv. substations will be added in the rural area, and one 1,500-kva. and two 2,000-kva. 22/4-kv. substations will be added in the city area. All are single-circuit unit-type substations and all have supplemental fan ratings. Extensions will be made to the new secondary underground network. Two miles of 22-kv. subtransmission will be placed underground in existing ducts.

System peak demand is expected to increase from 83,000 kw. in 1948 to 90,000 kw. in 1949.—*Paul E. Shaad, chief electrical engineer.*

Farm Electrification by States

State	Total Farms Jan. 1, 1945	No. Farms Electrified July 1, 1948	Unelectrified Farms July 1, 1948	Per Cent Electrified Farms
Arizona	13,142	10,577	2,565	80.5
California	138,917	131,602	7,315	94.7
Colorado	47,618	38,009	9,609	79.8
Idaho	41,498	39,296	2,202	94.7
Montana	37,747	18,837	18,910	49.9
Nevada	3,429	2,022	1,407	59.0
New Mexico	29,695	13,994	15,701	47.1
Oregon	63,125	60,094	3,031	95.2
Utah	26,322	21,151	5,171	80.4
Washington	79,887	74,715	5,172	93.5
Wyoming	13,076	6,871	6,205	52.5
Totals	494,456	417,168	77,288	

San Diego Gas & Electric

The year 1948 fulfilled expectations with regard to a continuation of population growth and load that had been experienced in previous years, particularly in suburban and rural areas. There are no indications, at this time, that the growth will not continue through 1949. Capital expenditures in the electric department during 1948 totaled $8,000,000, and it is expected that the expenditures during 1949 will be approximately the same amount.

The major improvement during 1948 consisted of the completion of unit No.

2 in Silver Gate station. Originally scheduled for completion in 1947, this 50,000-kw. addition was placed in service in May, and provided sufficient added local generating capacity to carry the system load. Other major additions made during the year were a new 66-kv. substation at Otay to furnish energy to the fast-growing South Bay area; a 66-kv. substation at station B to couple the generating capacity of that station into the 66-kv. network; a 66-kv. tie line between Sampson and Otay substations; and a 66-kv. tie line between station B and Silver Gate station. During 1948 additions included 192,000 kva. in transformer capacity; 16 miles of 66-kv. transmission lines; and 240 miles of distribution lines. Net increase in active electric meters was approximately 11,150, which is 11% above that of the previous year.

The system peak for the year was 222,500 kw., an increase of 5% over 1947. This increase would have been greater had not daylight saving time been effective during the month of December when the peak occurred.

Major projects scheduled for 1949 include new 66-kv. substations at San Luis Rey (east of Oceanside), Escondido, Monserate, Warners Ranch and Santa Ysabel. These substations are in the northern and rural districts of the territory served by the company, and are part of a program instituted several years ago to take care of the extremely rapid expansion in those areas. In the metropolitan area, two new 66-kv. substations will be installed, one on the easterly side of San Diego, and one in the vicinity of La Mesa. Although not scheduled for completion until 1950, work will be continued on Silver Gate station unit No. 3. It is expected that by the end of 1949 the building extension will be completed and the installation of new equipment in progress. During 1949 it is estimated that the transformer capacity of the system will be increased by 92,000 kva., and that 30 miles of transmission lines and 200 miles of distribution lines will be built. It is expected that the 1949 system peak will be about 8% over that for 1948.

As of a year ago, the company had a backlog of electric customers numbering 4,000. The majority of these were in the suburban areas where line extensions of considerable length were required to reach the customer. During 1948 many of these extensions were completed and the backlog was reduced to approximately 2,500. In view of the fact that many long extensions have already been constructed, new customer connections will henceforth be completed at a more rapid rate. It is expected that a marked reduction in the backlog of customers will be made during the year.

It may be said that the year 1949 will present two major problems: first, the construction problems connected with the 66-kv. substations and transmission lines; second, the procurement of the necessary funds to finance the construction program.

REA Operation—Eleven Western States

State	Cumulative Construction Loans	1948 Loan Approvals — Amount	1948 Loan Approvals — Estimated Miles	1948 Loan Approvals — Estimated Consumers	Energized Systems — To Dec. 1, 1948 — Miles	Energized Systems — To Dec. 1, 1948 — Consumers	Energized Systems — To Dec. 31, 1947 — Miles	Energized Systems — To Dec. 31, 1947 — Consumers
Arizona	$ 10,810,786	$ 5,750,000	738	2,365	1,231	6,178	824	4,169
California	5,645,329	2,515,000	424	4,988	1,775	7,167	1,718	6,883
Colorado	28,889,551	7,051,000	2,248	4,877	11,579	35,718	9,820	29,212
Idaho	8,665,295	1,080,000	201	460	4,110	10,579	3,695	9,449
Montana	23,909,298	6,284,000	2,698	5,891	9,939	20,586	6,034	16,122
Nevada	286,000	0	0	0	147	675	147	671
New Mexico	12,144,000	2,855,000	1,040	1,665	4,288	11,849	2,824	8,819
Oregon	15,224,684	3,729,000	700	2,704	5,385	18,686	4,566	15,675
Utah	2,367,000	220,000	73	37	1,076	3,138	969	2,934
Washington	19,867,611	3,718,000	360	1,512	8,647	20,425	7,831	18,388
Wyoming	10,412,600	1,947,000	967	1,175	4,276	9,637	3,421	8,181
Totals	$138,222,154	$35,149,000	9,449	25,674	52,453	144,638	41,849	120,503

Southern California Edison

In 1948 we spent approximately $60,000,000 for additions to generating capacity, new substations, transmission lines, distribution lines, and additions to system facilities. For the year 1949 we have budgeted $74,000,000 for system betterments. On Oct. 26, 1948, the conversion of consumers from 50 cycles to 60 cycles was completed, so that there are now no 50-cycle consumers in the state of California.

The first section of the Redondo steam plant was completed in the early part of the year, with one 66,000-kw. unit coming into service in February, and the second in April. The fourth unit of 35,000-kw. capacity at Big Creek No. 3 plant was placed in service in April 1948.

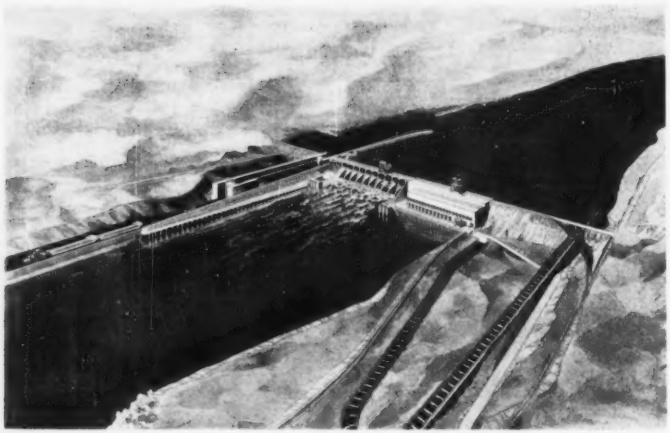
Two major 220-kv. substations were placed in service during the year. One is in the San Joaquin Valley, known as Springville with 75,000-kva. capacity, and the second is known as Mesa with 75,000-kva. capacity, located in the San Gabriel Valley. In addition, 39 new substations were constructed and put into service during the year with a capacity of 223,000 kva., and 254,000 kva. of transformer capacity was added to existing substations, mak- a grand total of 627,000 kva. added to substation capacity during 1948.

During the year 767 miles of line were constructed, of which 576 were transmission and distribution lines of 11 kv. or higher, and 191 miles were rural lines. Approximately 70,000 new customers were added in 1948, with a net increase in connected load of approximately 600,000 hp.

The year 1948 was again a banner year, being greater than 1947, which as stated last year "was the biggest year experienced in the company's history in the building of lines, construction of new substations, and service to new customers." The second 100,000-kw. unit at Long Beach steam plant No. 3 was converted to 60 cycles during the early part of the year. The conversion of the 60,000-kw. unit at plant No. 2 was postponed so as to keep its capacity available during the year. In order to make this 60,000-kw. unit and the three old units at Long Beach steam plant No. 1 available to the 60-cycle system, it was necessary to move the frequency changer from Highgrove substation to Lighthipe substation, which is only a few miles from Long Beach steam plant.

Due to the drought situation in the early part of 1948, two major additional interconnections were rushed to completion between the Department of Water & Power of the city of Los Angeles, and the Edison systems, which made a total interconnection capacity of 225,000 kva. between the two systems. This enabled steam-generated kilowatt-hours of the city of Los Angeles, and the Public Service Department of the city of Glendale to be delivered to the Edison system for delivery to the north. Steam-generated energy also was made available from the systems of the San Diego Gas & Electric Co. and the Municipal Light &

Site of Detroit Army Engineers project now under way will develop 90,000 kw.



Ice Harbor Dam and power plant, a U. S. Army Engineers project on the Snake River in Washington. Will bring in 65,000 kw. in 1953 and 130,000 kw. in '54

Power Department of the city of Pasadena through the Edison system.

During 1948 an active program of modernization of 220-kv. and 66-kv. oil circuit breakers has been carried out on the whole system. For the last two years we have been using a helicopter for the patrolling of the 220-kv. lines in mountainous and desert areas. In connection with the location and survey of two new 220-kv. lines the helicopter has been of great advantage in scouting in the mountainous areas where there are practically no roads and where it is very difficult to get an over-all picture from the ground. After selection of a tentative route from the air, a sack of lime is dropped from the helicopter at each of the angle points. These angle points can be picked up very easily by the survey parties on the ground and this method has saved many days of hard work in the location and preliminary survey of new transmission lines.

Plans for 1949 contemplate the installation of two additional 66,000-kw. turbogenerators at Redondo steam plant. The building to house these units and the stacks are practically completed. Boiler erection will start within a few weeks, and it is expected the first unit will be in service in midsummer, and the second in the early fall. The original sea water intake and discharge lines were designed to take care of four units so that no modifications or additions are required.

Application for license is being prepared for construction of Big Creek No. 4 power plant. It is hoped that construction will be started before the end of the year. Plans contemplate the installation of two 42,000-kw. units with one transmission line connected to Big Creek No. 3, and the second to Springville substation.

Twenty-three new substations are planned for 1949. These substations, together with additional transformers to be installed in existing stations to take care of the increase in load, will require approximately 800,000 kva. of substation transformers. It is expected we will construct 850 miles of transmission and distribution lines in '49.

Since the close of the war, a large part of the construction activity has been the installation of additional generating capacity and the building of lines to take on new consumers. A large number of the new customers, particularly small industries, and commercial establishments have come on existing lines (saturation business), and studies indicate that it is necessary that we reinforce the existing distribution system to take care of the additional loads which have been added, and the potential loads which will come on in the developed areas. An interesting phase of our budget for 1949 is that approximately 50% of the total amount of the budget is for distribution lines and substations.—*N. B. Hinson, vice-president.*

Turlock Irrigation District

Construction budget of $316,000 for 1948 covered 19 miles of 12-kv. distribution line, 5,000 kva. increase in substation capacity, and the connection of 1,350 new electrical customers. General additions and betterments to generating plant were also included. A 1949 budget of substantially the same amount will cover continued expansion and a new 8,000-kva. substation. —*L. H. Parker, electrical engineer.*

Colorado

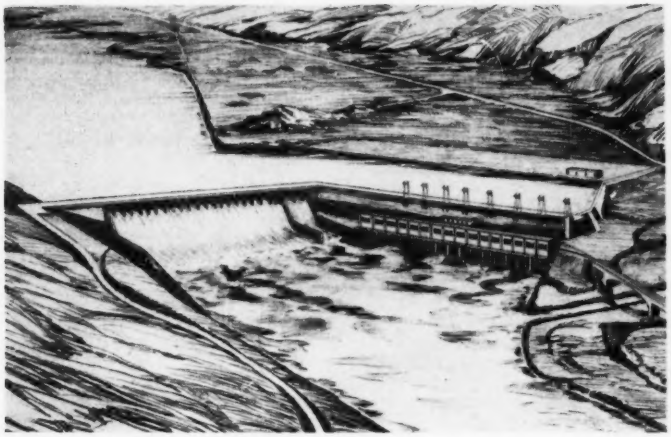
Colorado-Big Thompson, USBR

Construction of the Granby pumping plant is continuing and will be about 60% completed by the end of January. Construction is also continuing on the Marys Lake power plant and switchyard and on the Estes Park power plant and switchyard. Completion of the structure is expected in 1951. Rams Horn and Prospect Mountain tunnels were completed in June 1948, and Aspen Creek siphon was completed in October 1948.

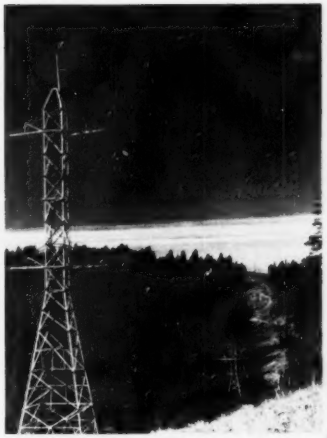
Specifications are being prepared for the construction of approximately 107 miles of 115-kv. transmission lines, including the Flatiron-Greeley, Estes-Granby, and Estes-Marys Lake lines, and the 69-kv. Brush-Yuma line. The 115-kv. Brush-Sterling and 69-kv. Sterling-Holyoke lines, totaling 85 miles in length, were complete in June 1948.

Colorado Central Power

We spent $710,000 for new and improved facilities in 1948. Our budget for 1949 is $500,000. The reason for this difference is that some of our major projects were built in 1948. During 1948 the balance of the Golden distribution system was converted from 2,400-volt delta to 4,160-volt wye; progress was made on the conversion of the Englewood distribution system from 2,400-volt delta to 4,160-volt wye; nine miles of line were built in the Fort Lupton district and insulated for 44,000 volts. At the present



Sketch of Army Engineers proposed Chief Joseph development on the Columbia 51 miles below Grand Coulee Dam. Plant would have 16 units of 64,000 kw. each



Grand Coulee-Snohomish 230-kv. line being built by Bonneville Power Adm.

time, it is being used as a 13,200-volt feeder but will be converted in the future to the higher voltage to serve a new substation and increased load.

No additional generating capacity was installed as we purchase all of our energy; 3,000 kva. of transformer capacity has been installed; 1,500 kva. of this capacity is in a 13,200-7,200-volt substation. Approximately 70 miles of distribution lines in addition to considerable urban system were built in 1948. This line ranges in voltage from secondary to 2,400/4,160-volt wye and 13,200-volt delta. We have gained 1,650 new meters this year or an increase of approximately 11½%.

During 1949 we plan to install new mercury vapor street light systems in three towns not heretofore served by this type of lighting. This will be in addition to increasing the number of 20,000-lumen mercury vapor lights in three cities in which installations of this type lighting were made in 1947 and 1948. We also will install a number of incandescent lights of higher lumen capacity than has been formerly used.

Installation will be completed of 2-way mobile radios in all districts with complete coverage from one transmitting station. One 1,500-kva. substation will be installed in Littleton and another near Englewood increased from 450 kva. to 1,000 kva. Probably 2,500 kva. of distribution transformers will be installed. Also one new feeder in the Golden district. This line will be 13,200 volts with carrying capacity sufficient to handle the entire district. It will be seven miles long. Planned are two high carrying capacity feeders between substations in Englewood and Littleton. These lines will be approximately four miles long. We will build about 75 miles of general distribution circuit in voltages ranging from secondary to 13,200 volts.

We expect an increase of 10% in the number of customers served with a 15% increase in load. All new construction is planned to handle an expected doubling of load in the next ten years.—*J. E. Wilson, vice-president.*

Frontier Power

In 1948, we spent for new and improved facilities $216,000 and for the same purpose during 1949, we expect to spend $175,000. During 1948, $145,000 was spent for the installation of a 50,000 lb. per hour coal-fired boiler in our Walsen generating station, with about $100,000 still to be spent before the boiler will be placed in operation early in 1949. Only minor changes were made in transmission and distribution lines during 1948. We had a net addition of 676 meters, equal to 8.2%. The 1948 system peak was 10,400 kw. This represents a 3% increase over 1947. An increase of approximately 3% in system peak is also anticipated for 1949.

During 1949, we intend to increase our transmission transformer capacity by 2,000 kva., install a 1,500-kva. substation in the town of Walsenburg, and add distribution voltage regulators in the town of Springer, N. M. On Jan. 3, 1949, the city of Trinidad began municipal operation of the distribution system. This means a loss of about 4,400 meters. However, the company will continue to supply electricity to the city under a wholesale contract.—*George Warren, electrical engineer.*

Colorado Springs P.U. Dept.

About $1,100,000 was spent for betterments in 1948 and $1,220,000 is budgeted for 1949.

Installation of new switchgear and cables and enlargement of the steam power plant building to accommodate a new 10,000-kw. unit is now in progress. About 4,200 kva. in distribution transformers were added—an increase in transformer capacity of about 15%. About 25 miles of 6.9-kv. distribution lines were built and we had about 5% more meters in service in 1948 than in 1947.

We are working on power plant enlargement now and are planning a 13.8-kv. transmission ring around the city to connect substations.

During 1949, 10,000 kw. of steam generating capacity will be added; about 3,000 kva. of distribution transformer capacity; about 8 miles of 13.8-kv. transmission line and about 25 miles of 6.9-kv. distribution lines will be added. A load increase of about 12% is anticipated and about 5% increase in number of meters.—*F. H. Wiley, superintendent electric division.*

Public Service of Colorado

The 1948-52 construction program of $63,000,000 is well under way with some $14,300,000 having been spent in 1948 and $17,500,000 anticipated for 1949. Expenditures for electric facilities in 1948 totaled $11,000,000 and the estimate for 1949 amounts to $12,900,000.

In 1948, additions of 40,000 kw. of steam generating capacity were completed, consisting of a 5,000-kw. unit at Grand Junction and a 35,000-kw.

unit at Lacombe station in Denver. Work was also started on the new Arapahoe station in Denver, which will have an initial capacity of 80,000 kw. During the year 1948, 36,687 kva. were added to substation transformer capacity and 26,400 kva. to distribution transformer capacity. Approximately 62 miles of transmission lines, with voltages from 13 kv. to 110 kv., and 205 miles of distribution lines were built during the year. Approximately 11,000 additional electric customers were added during the year.

There will be no new generating capacity added in 1949, but work on the new Arapahoe plant will be in full swing, 40,000 kw. being scheduled for completion in 1950 and 40,000 kw. in 1951. It is anticipated that the following additions also will be made in 1949: 112,000-kva. of substation transformer capacity, 25,000 kva. of distribution transformer capacity, 67 miles of transmission lines ranging from 13 kv. to 110 kv., and 195 miles of distribution lines. An addition of approximately 6,500 electric customers is expected during the year 1949, with an anticipated 6% load increase.—*M. M. Koch, vice-president.*

Southern Colorado Power

The amount spent for new construction in 1948 was $2,984,128. Budgeted for 1949 is $1,212,347. The main construction work in 1949 will be completion of jobs already started.

Due to shortage of skilled labor and some materials, the 15,000-kw. turbogenerating unit for the Pueblo, Colo., plant scheduled for completion in December 1948, will not be completed until May 1949. A recent estimation of the cost of this generating unit when completed is $3,059,203, which amount includes an outdoor switching station, with eleven 15-kv. oil circuit breakers, each one million kva. interrupting capacity. Substations at Rocky Ford and Canon City, at an estimated cost of $580,000, were 75% completed in 1948.

Transformer capacity added in substations was 16,500 kva., distribution, 4,700 kva.; 46 miles of distribution was built. Net gain in meters was 1,593.

We have no definite plans but probably a 10,000-kw. unit and a 5,000-kw. unit will be added during 1949.

The regular 1949 construction budget, covering short distribution and rural line extensions, necessary small plant improvements, substations and completion of the 15,000-kw. generating plant, amounts to $1,212,347. Anticipated load increase for 1949 is estimated at 10,000 kw.—*M. G. Lord, vice-president in charge of operation.*

Idaho

Army Engineers, Walla Walla

Lucky Peak Dam—Located on Boise River, ten miles upstream from Boise, Idaho, this dam is primarily intended to provide flood control but by operation in conjunction with existing Arrowrock and Anderson Ranch reservoirs, the project will provide additional benefits to irrigation, with power contingent upon Bureau of Reclamation plans. A definite project report will be completed in 1949 and final designs, plans and specifications will be 50% completed by June 30, 1949. A continuing contract will be let in 1949 for initial work on construction of the outlet tunnel. Funds available for fiscal year 1949 total $590,000.

Boise Project, USBR

Construction of Anderson Ranch Dam, highest earthfill dam in the world, is completed except for construction of the spillway. Work was started on the power plant in April 1948. The power plant is to house two 15,000-kva. generating units scheduled for 1950. Provision for future installation of a third 15,000-kva. unit has been made.

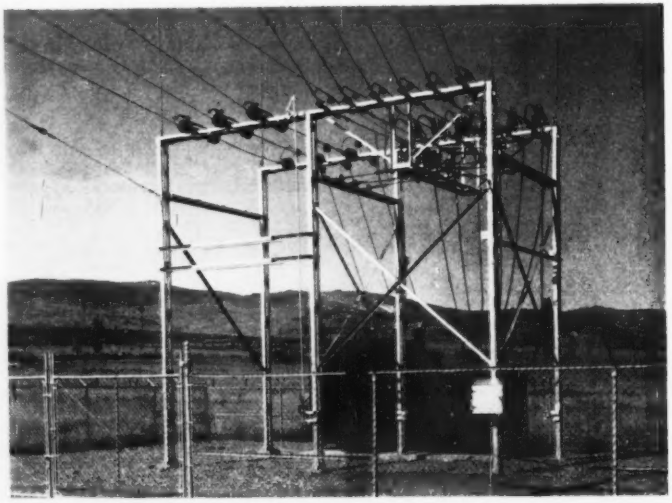
Idaho Power

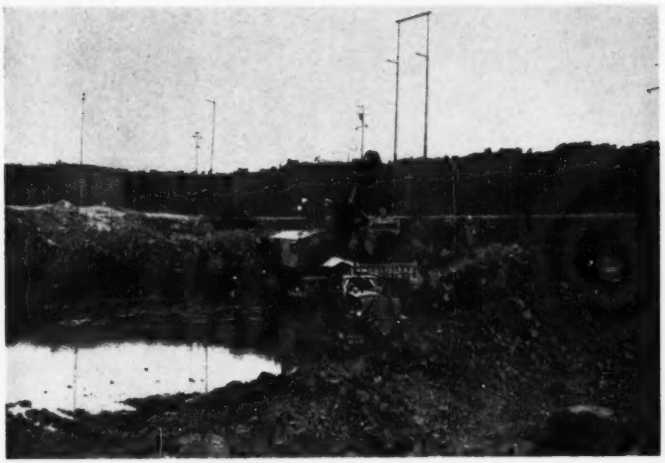
Idaho Power Co.'s construction program for 1948 amounted to approximately $14,400,000, the largest of any year in the company's history. The tentative construction budget for 1949 is well over $19,000,000. During the past year two hydroelectric power plants have been placed in operation, both on the Malad River, one rated at 7,200 kw. and the other at 13,500 kw. These power plants replace an older power plant rated at 5,000 kw. In addition, work has progressed on two other power plants; one at Lower Salmon Falls on the Snake River rated at 60,000 kw., the other at a point on the Snake River approximately six miles west of Bliss, Idaho, to be called the Bliss power plant and rated at 69,000 kw.

Approximately 51,600 kva. of additional substation transformer capacity were installed and new transmission line mileage added consisting of 34 miles of 138,000-volt line and 45 miles of 69,000-volt line. In addition to this, work was started on approximately 215 miles of 230,000-volt line, and approximately 42 miles of 69,000-volt line. Approximately 750 miles of distribution lines, both rural and urban, were constructed during the year. 20,000 kva. of static capacitors were added at various points on the distribution system and at substations. It is estimated that about 7,500 new customers will have been added by the end of the year.

During 1949 it is expected that 77,300 kw. of power plant capacity will be added to the system. This will include the completion of the Lower Salmon Falls development and will include the first unit at the new Bliss plant. The remaining two units at the

Highland unit substation was installed as part of a system-wide expansion program of the Sierra Pacific Power Co. serving Reno and parts of western Nevada





Excavation in spillway cofferdam at McNary Dam. U. S. Army Engineers photo

Bliss plant will be placed in operation early in 1950. During the year it is hoped to complete the construction of approximately 215 miles of 230,000-volt transmission line, insulated for 138,000-volt operation. In addition, approximately 75 miles of 69,000-volt transmission will be added to the system, along with 3½ miles of 138,000-volt line. Additional lines to be started but not completed during 1949 include approximately 85 miles of 69,000-volt line and 45 miles of 138,000-volt line.

If promised deliveries of substation transformers are realized, approximately 110,000 kva. of substation transformer capacity will be added during the year, and it is expected that the present program of distribution expansion will be continued during 1949 amounting to approximately 750 miles of added rural and urban distribution lines. The anticipated peak load for 1949 is approximately 220,000 kw., or roughly 40,000 kw. more than 1948. This will include the first unit of the phosphate fertilizer furnace load to be taken on in the Pocatello area. Along with other parts of the country, southern Idaho has experienced a rapid growth in power load since the war, and at the present time this growth is continuing about as it has for the past several years.—*B. C. Russell, general superintendent.*

Montana

Hungry Horse Project, USBR

Construction of Hungry Horse Dam began in June 1948. The dam is to be a concrete-arch structure about 530 ft. above foundation and 2,000 ft. long at the crest. A contract for the four 75,000-kva. generating units for the power plant was awarded in May 1948. Initial operation of the first generating unit is planned for June 1952.

Nevada

Sierra Pacific Power

Sierra Pacific Power Co.'s electric department spent $1,600,000 for new and improved facilities in 1948. The preliminary 1949 budget provides for expenditures of approximately $2,000,000. The increase is largely due to anticipated expenditures on a new 120-kv. transmission line.

Construction in 1948 consisted principally of extension and betterments in the distribution system. Only increase in generating capacity was installation of a 650-kw. emergency diesel unit in Reno. Increase in line transformer capacity was 18%; miles of distribution lines, of voltages ranging from 2.4 kv. to 13.8 kv., totaled 56. Number of meters in service increased 15%.

The 1949 program contemplates the usual run of additions to the distribution system, including 11,000 kva. of substation transformer capacity; increase in line transformers comparable to 1948; 30 miles of transmission line, 60 kv. and 120 kv.; and about 30 miles of distribution lines of various voltages. Conversion of distribution in the Reno business district from overhead to underground will begin with installation of 2,000 kva. in subway transformers, 4.3 kv. primaries and 125/211-volt Y secondaries, in two blocks. A new 60-kv. line, 15 miles in length, will be built between Truckee and Tahoe City, Calif. Anticipated increase in kilowatt-hour sales is 11½%; number of customers, 7%. —*V. D. Armstrong, engineer.*

New Mexico

P. S. of New Mexico

During 1948 approximately $3,400,000 was spent in capital improvements by the four divisions of our company, and a total of $3,100,000 has been budgeted for 1949. A 1,500-kw. turbogenerator and boiler was put into service at Las Vegas early in 1948, and a 11,500-kw. turbogenerator and boiler in Albuquerque in December 1948.

We added approximately 13,000 kva. in distribution transformer capacity. No additional transmission lines or distribution substations were built but there were added about 50 miles of rural and urban distribution lines. An additional 2,000 kva. in capacitors was installed during the year. New additions in meters were 5,600 and in consumers, 5,000. Our Albuquerque-Santa Fe system peak increased better than 5,000 kw. to a total of 34,800 kw. or 17.5% over 1947, and our kwh. for the entire system increased 30%.

Plans for 1949 include a new power plant building and 6,000-kw. turbogenerator with necessary switchgear, transmission substation, etc., at Santa Fe. We will also install a 5,000-kva. three-circuit distribution substation to serve the downtown load when we move our power plant to the new location. At the same time we will start changing the distribution system from 2,400 volts to 4,160 volts. During 1949 we will rebuild the Santa Fe street lighting system, installing modern standards in the business district and extend and increase the lighting in the residential districts. We will finish the installation of new street lighting standards in the business district of Deming, N.M., and install two new substations to serve irrigation customers.

Most of our capital requirements in Albuquerque in 1949 will be on the distribution system. This will include four distribution substations having a total capacity of 7,500 kva. and the reinforcing and extending of distribution feeders. We anticipate installing approximately 15,000 kva. in distribution transformers in 1949 and about 6,000 meters. We also expect a minimum increase of 5,000 kw. in our Albuquerque-Santa Fe peak and about 25% increase in distributed kwh.—*E. M. Cornell, electrical engineer.*

Oregon

Army Engineers, Portland

Other than Bonneville Dam on the Columbia River, the only project of the Portland District, Corps of Engineers, embracing power development is Detroit Dam on the North Santiam River, a tributary of the Willamette River, 12 miles east of Mill City, Ore. Bids for the main structure are expected to be opened about Feb. 24. The contract will be in excess of $20,000,000. It will not include the power house or the Big Cliff reregulating reservoir. However, it will include excavation for the Detroit power house. Estimated total cost of Detroit Dam, including the power house and reregulating reservoir, is approximately $65,000,000.

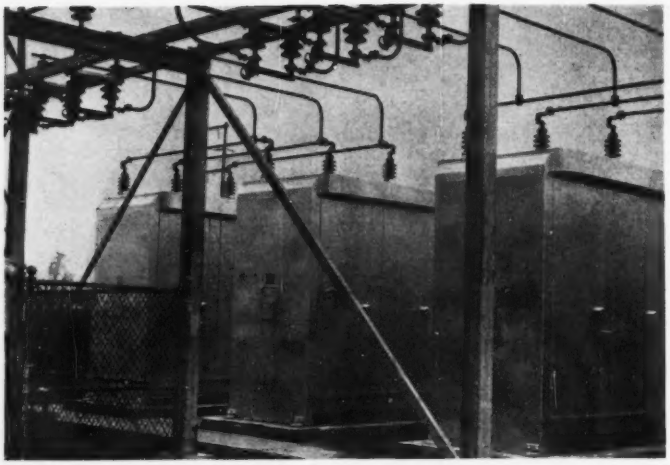
Reconstruction of the North Santiam Highway by the Public Roads Administration, necessary before work on the dam proper can begin, will be completed by July 1, 1949, but many parts of the road will be ready for travel much earlier than the final completion date. One of the several units in the comprehensive plans for flood control, power, navigation and other purposes in the Willamette River Basin, Detroit Dam will be located at the boundary of Linn and Marion counties, six miles west and downstream from Detroit, Ore. Completion time is estimated at four years.

Detroit Dam will be an all-concrete, straight-gravity structure, including the spillway and abutment sections. It will be 1,500 ft. long, 448 ft. high above the lowest excavation, and 28 ft. wide with a road at 20 ft. wide. Total rated power installations will be 100,000 kw. Now an integral part of the Detroit project is the Big Cliff reregulating reservoir, to be located 2.8 miles downstream from the main dam. It will have a 16,000-kw. power installation. Estimated cost is $6,478,000.

Bonneville Power Administration

Reflecting 1948 calendar year operations of the Bonneville Power Administration was the peak demand on Bonneville and Grand Coulee dam plants of 1,703,000 kw. (14% over rated generator capacity) carried Sept. 29. Delivery of 11,360,000,000 kwh. during the year brought in revenue of $26,110,000, up 22.6% and 18.0% respectively over 1947. This increase was accounted for by the growing power requirements of all classes of customers.

Expenditures during 1948 amounted to $18,000,000. Approval of the present budget before congress, including the supplemental request, will increase that figure to an estimated $37,000,000 in 1949. The increase is largely based on material and equipment deliveries on items ordered against contract authorizations during the last half of 1947 and during 1948. Increased construction of major transmission facilities is also planned.



Part of recent 5,000-kva. capacitor installation at BPA Cowlitz substation

Peak generating capacity was increased during the year by addition of two 120,000-kw. units at Grand Coulee, or total of 240,000 kw. Only federal plant additions scheduled for 1949 are three more 120,000-kw. units at Grand Coulee. The next new federal plant scheduled for operation is Anderson Ranch in Idaho in 1950, with two units of 13,500 kw. each.

Transmission system additions during 1948 included 44.5 miles of 230-kv. and 162 miles of 115-kv. line, and 123,425 kva. of transformer capacity. To improve system loading conditions, 100,000 kva. of shunt capacitors were added.

Scheduled for addition to the system in 1949 are 324 miles of 230-kv. and 240 miles of 115-kv. line, 650,000 kva. of transformer capacity, and 110,000 kva. of shunt capacitors. Installation is also planned of 70,000 kva. in synchronous condensers, consisting of a 20,000-kva. air-cooled unit in the Port Angeles substation and a 50,000-kva. hydrogen-cooled unit in the Snohomish substation.

Short-term contracts (one year) are being executed with five major private utilities of the region providing for delivery of 370,000 kw. Companies are Pacific Power & Light, Washington Water Power, Portland General Electric, Puget Sound Power & Light, and Mountain States Power. Power requirements of the Atomic Energy Commission, Hanford, Wash., were also met. There were 92 Bonneville customers at the end of the year 1948, an increase of 7 over the previous year.

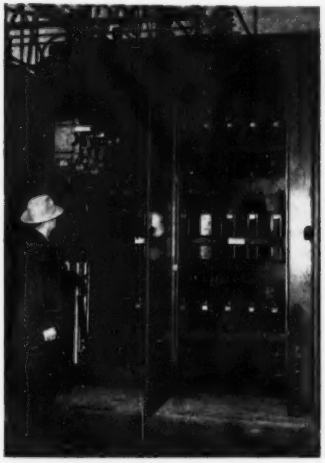
Potential peak requirements of 4,793,000 kw. will be needed on the federal system by 1957 to meet power needs of the Pacific Northwest, according to estimates of the Bonneville Power Administration. This represents nearly three times the current load and corresponding generating facilities would harness approximately one-fifth of the potential hydroelectric energy of the Columbia River and its tributaries.

California Oregon Power

During the year 1948 the construction budget, amounting to about $6,000,000 was divided into about $2,500,000 for the construction of additional hydroelectric plant on the North Umpqua River in Oregon, and $3,500,000 for installation of transmission and distribution facilities to provide service for an additional 6,000 customers in the area served by the company.

The system peak reached a maximum in December 1948 of 182,000 kw., or an increase of about 27,000 kw. over the 1947 December peak.

For the year 1949 additions and betterments to the company's system are, generally, the expenditure of $3,500,000 on additional hydro developments on the North Umpqua River in which is included completion of the transmission line between Dixonville and the Toketee hydro plant which will connect 27,000 kw. to the north end of the company's system during



Capacitor bank at BPA St. Johns sub

the latter part of 1949. In addition there is included in the general expansion program the construction of a 125-kv. line between Glendale, Ore., and Days Creek to provide additional power for the Grants Pass area.

The total budget of the company for the year 1949, which is in excess of $8,000,000, provides also for general expansion for the system in the construction of substations, distribution lines and installation of capacitors and regulators to take care of the needs of the customers now being served as well as forecast growth of an additional 6,000 customers for the year 1949.

Eugene Water Board

The Eugene Water Board is continuing its expansion program to add from 16,000 to 27,300 kw. of generating capacity, depending on McKenzie River flow. (The season of high river level usually coincides with peak load season.) Because work on the three major projects is under way, it is difficult to separate expenditures by years. The following gives totals expended on the various projects up to Sept. 30, 1948, along with the estimated cost to complete the projects by early 1950:

Project	1946 to Sept. 30, 1948	Est. cost to complete
Walterville hydro	$ 79,000	$1,373,000
Leaburg hydro	154,000	345,000
Steam plant	110,000	1,366,000
Distribution system	1,151,000	1,655,000

The expansion program is going ahead pretty much as reported in the 1948 survey.—*R. B. Boals, general superintendent.*

Mountain States Power

The year 1948 was another year of great construction activity for this company. The only generating equipment installed during this year was one 1,000-kw. internal combustion unit installed at the Tillamook, Ore., plant and one 1,000-kw. unit installed in the Lander, Wyo., plant. Additional boiler capacity was installed in Springfield, Ore., which will make available an additional 3,000 kw. of generating capacity not previously available due to shortage of boiler capacity. Considerable work was done in new 66-kv. substations at Cottage Grove, Springfield, Albany, and Coos Bay, Ore. The amounts expended for construction totaled approximately $4,500,000, the majority of which was spent for distribution equipment. Included in the above total was approximately $400,000 for telephone and water utilities.

The majority of the 1949 construction budget, which totals approximately $4,500,000, is also for additions and extensions of the distribution system.

Pacific Power & Light

A new construction record was set by Pacific Power & Light in '1948, when $8,000,000 was spent on additions and improvements to the company's system (which now includes the old Northwestern Electric property). Expansion demanded by the continuing growth of the Pacific Northwest is expected to top that record during 1949, with expenditures going well beyond that figure. Completion of the 1949 program will bring to more than $25,000,000 the building done on the company's system since the end of the war.

Major project for the year will be installation of a second 45,000-kw. generator at the Merwin (formerly Ariel) hydroelectric project, together with related central substation facilities for handling the increased output of the Lewis River plant. The new unit is scheduled for operation in December 1949. Total cost of the combined project will exceed $4,000,000, of which some $3,800,000 will be spent during this year. Preliminary phases of the work, including a new access bridge to span the gorge of the Lewis River below the dam, started in October of 1948.

Acquisition in November of a three-block area in the Albina district of Portland cleared the way for construction of the new Albina substation which will tie in with the power project. It will be the terminal for all transmission lines feeding into the company's system in Portland and eventually will replace the present Albina substation as the central point of the Portland area. Two 50,000-kva. 3-phase 110/66/11-kv. transformers will be installed in the new substation. They are among the largest in the Pacific Northwest and under cooling will have maximum bank capacity of 166,666 kva.

Major single undertaking of 1948 was the rush construction, completed in just over five months, of a 60-mile transmission line to link the company's central Oregon power system to its main system along the Columbia River. The 42-mile center section of the new line is built for eventual conversion to 230-kv. operation but is being operated now at 66 kv. Other phases of the project included reconstruction and strengthening of a connecting transmission line and construction of a new heavy substation at The Dalles to serve as a system interconnection with lines of the Bonneville-Grand Coulee system.

Other major projects included construction of Willbridge substation, a 40,000-kva. installation serving Portland's rapidly expanding industrial Guilds Lake area, and boiler reconstruction which served to increase steam capacity by 130,000 pounds per hour at Lincoln generating plant. The Willbridge substation also serves as a tie with the Bonneville system, to which it is linked by a 4½-mile, 110-kv. line. Approximately 54,500 kw. of distribution transformers, 250 miles of distribution line and 10,000 meters were added to the system during the year.

Program for 1949 calls for addition of about 30,000 kw. of distribution transformers and construction of approximately 200 miles of distribution lines. It contemplates construction of some 26 miles of transmission line, chiefly at 66,000 volts. Estimates indicate addition of about 4,000 customers during the year.—*D. R. McClung, vice-president.*

Portland General Electric

Our 1948 construction expenditures amounted to $7,750,000. It is expected that the 1949 expenditures will exceed the 1948 figure. The 1948 peak exceeded the 1947 peak by 11.1% and the 1948 kwh. load exceeded the 1947 kwh. load by 15.5%. It is believed that the company's load-molding program (made necessary by the peaking capability of the Northwest Power Pool) was responsible for the fact that the peak increased by a lower percentage than the kwh. load.

During 1948 the company added three new connections to the Bonneville system with the following interconnecting capacities: St. Louis (110 kv.) 11,000 kva.; St. Mary's (110 kv.) 32,000 kva.; St. Johns (11 kv.) 20,000 kva.; total 63,000 kva. Bonneville also installed a second transformer bank at Salem, which increased its 115/57-kv. transformer capacity at that point from 50,000 kva. to 100,000 kva. However, all of this capacity is not available for serving the company's load. In 1948 we started construction on two 57-kv. 795-MCM ACSR transmission lines, which will connect BPA's 250,000-kva. 230/57-kv. transformer bank at Troutdale with the company's Lents and Tabor substations. This interconnection is scheduled for completion by April 1, 1949.

In orderd to obtain full kw. output from Grand Coulee generating units and facilitate power transmission over BPA's long, heavily loaded transmission lines, it is necessary that high power factors be maintained at the various points of interconnection at the receiving ends of transmission circuits. To support voltage and reduce transmission losses, the company installed 40,000 kva. in shunt capacitors in 1948. Most of these capacitors were of the switched type in order to prevent excessive voltage during low-load periods. It is anticipated that a substantial addition of similar capacitor units will be required in 1949. In 1948 the company added 92,588 kva. in substation transformer capacity. The above figure covers transformer additions for all voltages. It is expected that similar additions will be made in 1949.

1949 Program

The company's construction program for 1949 is concerned with the following problems: strengthening its Bonneville ties; reinforcing its 57-kv. transmission grid; increasing 57-kv. distribution step-down capacity; increasing system reactive capacity; increasing capacity and voltage of distribution feeders, and revamping power supply and feeder system for the a-c underground system. Present feeder voltage is 4.15 kv.; all future additions will be made at 11 kv.

Along the line of new equipment, it may be of interest that the company has installed two 115-kv. load break disconnecting switches. These switches are installed on the high-tension side of two 16,000-kva. transformer banks connected to the BPA 115-kv. system. The switches break the load under oil. These switches were manufactured by the Schwager-Wood Corp. in Portland. —*John Bankus, chief engineer.*

Utah

Telluride Power

Construction of 50 miles of 44-kv. transmission and 25 miles of distribution lines, with the addition of 1,000 kw. of substation transformer capacity, the enlargement of distribution system capacity, installation of two additional 44-kv. sectionalizing oil circuit breakers, and 250 meters accounted for the major part of the $225,000 spent for capital improvements in 1948. Peak load increased by 31.5%; 12 miles of 44-kv. line and 1,800-kw. in substation capacity were installed by customers.

Included in the $250,000 budget for 1949 are purchase of 30 miles of 44-kv. line; construction of 20 miles of distribution lines; installation of 10,000 kw. of interchange transformer capacity, and miscellaneous improvements to the transmission and distribution systems. Additional power required will be purchased from a neighboring utility.

Utah Power and Light

It is estimated that $6,150,000 was expended for new and improved facilities during 1948. The 1949 budget provides for the expenditure of approximately $10,000,000 for new plant. The principal reason for the large increase is the construction of generating plants in 1949. An addition to the Orem steam-electric station of 40/44 mkw. will cost approximately $7,100,000 of which $3,000,000 will be spent in 1949. Preliminary expense of $750,000 on a 60/66-mkw. extension to the Jordan steam-electric station in Salt Lake is planned. Total cost of this unit will be about $11,000,000.

Principal projects completed during 1948, were: Olmsted hydraulic wood flume replaced with 8 ft. 6 in. diameter steel pipe for 2¾ miles, $750,000; Riverdale-Devil's slide line, 29 miles of 44-kv. line with substation and connections to serve a cement plant expanding by 4,000 kw., $300,000; 25,000-kva. in 132,000/44,000-volt transformer capacity added at Terminal transmission substation near Salt Lake City (not connected in 1948), $160,000; postwar rural electrification program was practically completed, $500,000; design and engineering work on the 40/44-mkw. addition to Orem steam-electric station, $210,000.

Transformer capacity added during the year was 28,600 kva. at owned substations not including the 25,000 kva. mentioned above.

Transmission added was 88 miles of 44-kv. line; distribution lines included 350 miles (estimated) of 11 kv. and under. Net change in meters was 7,400 (estimated). The replacement of the Olmsted wood flume with steel is considered unusual in that the steel was manufactured within ten miles of the installation and fabricated at the site. The economy in the design features and the proximity of the steel made the price competitive with imported wood. There are several unique design features among which is a rubber expansion joint inclosed in a steel sleeve used in the pipe where it passes over a mud slide area which permits large lateral displacement as well as longitudinal expansion.

Steel flow line replaces wood stave pipe for Utah P. & L. hydro plant

This company has had for some time a contract whereby it obtains up to 30,000 kw. surplus power from a large steel plant. This year it was able to secure 53,000 kw. surplus from another large industrial plant in December 1948 and will receive a minimum of 25,000 kw. for the next two years. This additional power made it possible to supply large blocks of energy to other members of the Northwest Power Pool. During 1948 three municipally owned plants were connected to our system so that this company is now interconnected with every municipally owned plant, private utility and government-operated plant in the general service area.

Important programs for 1949 include: Orem extension, 40/44-mkw. steam station ($7,100,000 when com-

pleted), $3,000,000; Jordan addition 60 66-mkw. steam station ($11,000,000 when completed), $750,000; replace Weber hydraulic wood flow line with steel, $550,000; replace 132-kv. circuit breakers at important substations, $265,000; additional 132-kv. transformer capacity, 20,000 kva., $125,000; Oneida-Montpelier 132-kv. transmission line, 23 miles, $500,000; service department buildings, $315,000; strengthen 44-kv. network by construction of additional lines in several areas including 0.6 miles of underground gas-filled cable, $550,000; distribution substation capacity and feeder circuits, $1,500,000.

Other anticipated additions are: 137-kw. internal combustion at an isolated location not on our interconnected system; transformer capacity, 93,950 kva. at owned substations; miles of transmission, 23 miles of 132 kv., 110 miles of 44 kv.; miles of distribution, 300 miles of 11 kv. and under. We anticipate our system peak will be 28,000 kw. or 11.4% greater in 1949 than in 1948. It is expected that during 1949 our customers will increase 6,800 to a total of 155,600 or 4.6% increase.

A 1949 item of interest is a contract entered into with an independent telephone company which will permit it to use carrier current on 35 miles of our 44-kv. transmission line to serve a rural community of about 250 population. —*E. M. Naughton, assistant to vice-president.*

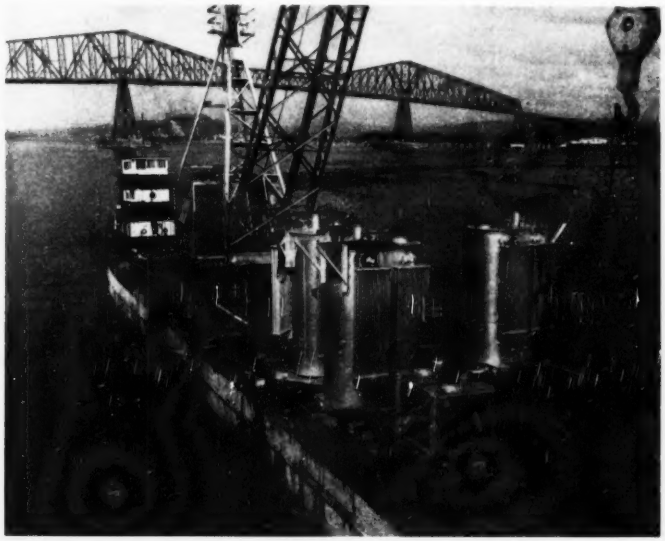
Washington

Army Engineers, Walla Walla

McNary Dam — During 1948 the cofferdam to inclose construction of navigation lock and 13½ bays of spillway dam for McNary Dam on the Columbia River, near Umatilla, Ore., was completed on the Washington shore. Excavation for lock was completed and concrete placement got under way. Excavation within the cofferdam for portion of spillway progressed and will continue in 1949. Contractors installed Noble batching and mixing plant, aggregate plant and tunnel, cement silo, gantry cranes and other necessary appurtenances. Contract for first four generators for power house was let to General Electric, delivery of embedded portion of generators to begin in summer of 1952. Ultimate power installation of 14 units will generate 980,000 kw. Program for 1949 includes continuing construction of lock, fishways and spillway. Appropriation for fiscal year 1949 totals $22,000,000.

Ice Harbor Dam—Preliminary planning for this power and navigation dam on the Snake River, 9.7 miles from its mouth, was carried on during 1948 and is 85% complete. This is the first of a series of four such dams on the Lower Snake River below Lewiston, Idaho. Exploration work is still under way. By the end of fiscal year 1949 some construction contracts can be awarded, providing supplemental funds are appropriated. Funds available for fiscal year 1949 total $380,000. The power house will initially have five generating units with capacity totaling 325,000 kw. and three units having a total capacity of 195,000 kw.

Lower Monumental Dam—This is the second dam in the series of four dams on the Lower Snake River. Topographic and hydrographic surveys were completed in fiscal year 1948. This dam will ultimately have five power units with an installed capacity of 300,000 kw. A total of $50,000 is available for additional studies on the project during fiscal year 1949.



Three 2,500-kva. transformers are barged 120 miles down the Columbia to Rainier, Ore., by Pacific Power & Light Co. for new substation to meet new loads

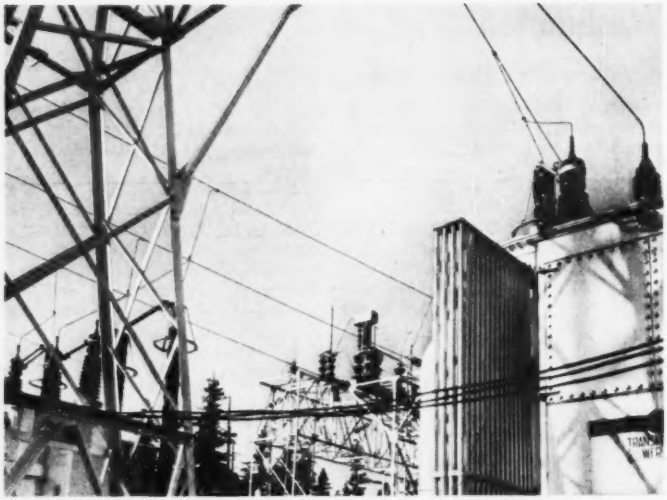
Army Engineers, Seattle

Chief Joseph Dam (formerly Foster Creek) is the only authorized project of the Seattle District, Corps of Engineers, which includes power development features. Chief Joseph is located on the Columbia River 51 miles downstream from Grand Coulee Dam near the town of Bridgeport, Wash. The dam will be a straight gravity overflow type, 220 ft. high and 1,484 ft. long. The spillway, with a capacity of 1,250,000 c.f.s., will be controlled by 24 forty-foot tainter gates. The power house intake will extend downstream on the left bank at an angle to the axis of the dam. The initial power house will provide for at least 16 sixteen-foot diameter Francis-type turbines. These units will operate at a head of 162 ft., driving 16 generators of 64,000 kw. each. Appropriations for fiscal year 1948 totaled $550,000 for engineering studies and designs. Fiscal year 1949 appropriations included an additional $42,000 for continued engineering studies leading to design of access highway and bridges, preliminary planning of the town to be constructed at the site, and field investigations of foundation and aggregate sources. Construction funds have not yet been appropriated by Congress.

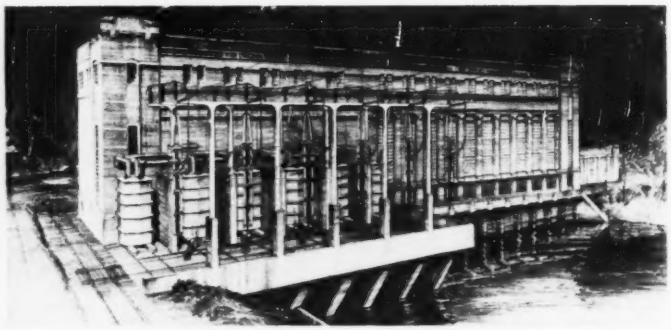
Clark County PUD

During 1948 the Clark County Public Utility District spent $600,000 on new and improved facilities, and has budgeted $1,400,000 for this year. The difference is due to rapid growth in demand, rapid growth of the county, and the condition of the system recently acquired.

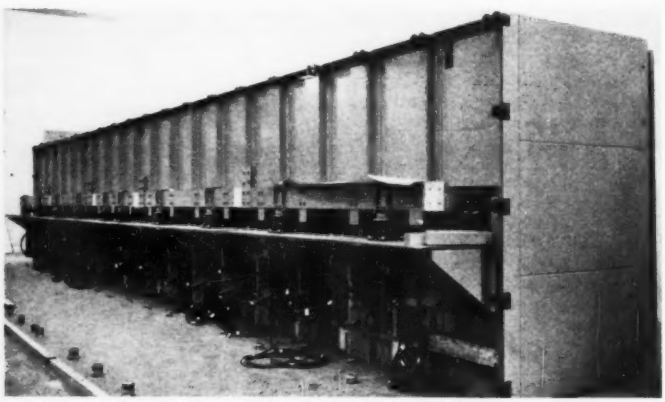
Transformer capacity was increased 3,000 kva.; 25 miles of distribution were converted from 2,400 to 11,000 volts; six miles of new 11-kv. line were built, and one mile of 66-kv. line



Beaverton substation gives Portland General Electric sixth Bonneville tie



Gorge power house of Seattle City Light where a 60,000-kw unit will be added



Rear view of 600-volt, d-c metal clad switchgear at First Hill substation of Seattle City Light to provide direct current for the Seattle transit system

was added. Net increase in meters was 5,814, of which 4,917 were meters installed in housing projects that previously were on a flat rate. The PUD purchased the distribution systems from the federal government and metered the dwellings. Net increase in new families and commercial customers was therefore 897.

Anticipated additions in 1949 include 5,000 kva. of substation capacity; 12½ miles of 66-kv. transmission line; 4,500 replacement poles and 1,200 distribution transformers (replacements primarily). Anticipated customer increase is approximately 1,000. The PUD plans to convert considerably more of its 2,400-volt distribution system to 11,000 volts during 1949.—*V. M. Cleaveland, manager.*

Grays Harbor PUD

Grays Harbor PUD. No. 1 of Aberdeen, spent $315,625 for new and improved facilities in 1948 and has budgeted $286,900 for this purpose in 1949. Three 1,000-kva. unit substations and 747 meters were added in 1948. Additions planned for 1949 include two 1,000-kva. unit substations and six miles of 110-kv. line.

Columbia Basin Project, USBR

Work on the project is being directed towards the completion of major features of the irrigation system and development of the Grand Coulee power plant hydroelectric facilities to an ultimate capacity of 2,300,000 kw. A contract for completion of the Grand Coulee pumping plant, which is to be the world's largest pumping installation, was awarded in October 1948. Present plans call for operation of the first pumping unit in December 1951.

The left power plant at Coulee Dam is virtually completed. The last of the nine 108,000-kw. main generating units was placed in operation in April 1948. Six of the nine generating units for the right power plant are now under contract, and it is expected that award of a contract for the remaining three units will be made in the near future. Scheduled operation dates for the first three units of the right power plant are April 15, July 15, and Oct. 15, 1949. Installation of auxiliary equipment for operation of the right power plant will continue during the next year to meet operating dates for all units.

Puget Sound Power & Light

During 1948 the company sold to PUDs its distribution properties in eight of the counties in which it oper-

ates. The 1948 figures include only normal additions and retirements of property.

Last year the company spent an estimated $7,200,000 for new facilities and has budgeted $7,431,000 for this purpose in 1949. 1949 expenditures are estimated as follows: fuel and water power stations, $60,000; transmission, $1,200,000; distribution, $5,660,000; miscellaneous, $280,000. No generating capacity was added last year; transformer capacity was increased approximately 100,000 kw. Approximately 60 miles of transmission (55,000 volts and over) and 160 miles of distribution line were built. Approximately 20,000 meters were added.

Expenditures planned for 1949: fuel and water power stations, $91,000; transmission, $941,000; distribution, $6,146,000; miscellaneous, $253,000. No increase in generating capacity is anticipated, but it is planned to add 95,000 kva. in substation transformers, 30 miles of transmission and 150 miles of distribution line. Increase in customers probably will be 11,100 and increase in load 36,000 kw.—*Frank McLaughlin, president.*

Seattle City Light

For the year of 1948, total expenditures for plant improvements amounted to approximately $6,335,000, of which about $4,000,000 was spent on the construction of Ross Dam and $725,000 on preliminary construction for a new concrete diversion dam for Gorge power plant, a tunnel and addition to Gorge power hosue to accommodate a 60,000-kva. turbogenerator, which will be installed as soon as the suppliers can make delivery, a year or two in the future. Approximately $1,610,000 was expended on transmission lines and the distribution system of the department. Ten miles of new transmission lines were built and 22,000 kw. in transformers installed. Deliveries of equipment and supplies were somewhat better than in the previous year.

The number of electric meters on the system increased to 127,800 (estimated), as compared with 122,869 at the end of 1947, or about 4% increase. The net system energy in 1948 increased 8.7% over the output for 1947. The 1948 system peak demand was 267,000 kw., as compared to the 1947 demand of 252,000 kw., an increase of 6%. This increase is less than was expected and would have been considerably greater except for cooperation of consumers in reducing peak demands. The annual system load factor for 1948 was 53.7%, an increase of 2.3% over the 1947 load factor of 52.5%.

Present plans for expansion of the department's facilities during the year of 1949 include the building of 25 miles of 26-kv. and 110-kv. transmission lines; 9 miles of 230-kv. lines; the installation of some 48,000 kw. in unit substations; the addition of a 60,000-kva. bank 230/26 kv. at South substation, and construction for additional hydro-generating capacity. This will involve the expenditure of an estimated $7,875,000 — divided into $3,000,000 for hydro stations, $2,575,000 for transmission lines, and $2,300,000 for distribution and other purposes.

The work outlined above is a part of an eight-year program for adding to and improving the service facilities of Seattle City Light, initiated in 1947, which is expected to involve some $50,000,000. In this program are included the installation of a 60,000-kw. turbogenerator at the Gorge hydro station, the construction of a dam in the Skagit River at the headworks of the Gorge station to replace an old log dam, and to provide an increase of 8 ft. in the head of this plant, the start of construction of Ross power house at Ross Dam and the ordering of equipment for the installation therein of three 90,000-kw. units, with the necessary additional transmission and distribution facilities to bring the additional energy to consumers.—*E. R. Hoffman, superintendent.*

Tacoma City Light

Experiencing a load increase of about 15.5% over last year, Tacoma City Light's 1948 annual gross requirements approximate 1.1 billion kilowatthours. The annual gross 60-minute peak demand of 210,000 kw. was experienced on Nov. 16 at 5 to 6 p.m., just prior to the effective enactment of a coordinated area-wide peak load curtailment program in Washington, Oregon and northern Idaho.

Increasing availability of electrical appliances and mounting fuel costs, resulting in more extensive use of electricity for house heating purposes, are largely responsible for a high average use of electricity per residential billing. Such usage approximated 5,700 kwh. for 1948 as against 5,220 for the year previous. The corresponding residential revenue was up about 11% over 1947.

During the year Tacoma City Light increased its installed transformer capacity approximately 121,000 kva. Plant account expenditures, including generating, transmission and distribution accounts, approximated 1⅓ million dollars. Maintenance expenditures, supplemental thereto, amounted to nearly ½ million dollars. Corresponding expenditures for 1949 are estimated at 3⅓ million dollars for plant accounts and more than ½ million dollars for maintenance.

Continued preliminary field and design studies are being made by and for the city of Tacoma on its proposed 345,000-kw. two-dam Cowlitz River power development. Usable storage will approximate one million acre-feet. Two 230-kv. 50-mile steel-tower transmission lines will deliver the power to a proposed new 230/115-kv. Cowlitz substation to be built adjacent to but south of Tacoma. Some generation is expected to be in operation by the winter of 1952-53.

With two existing hydro developments on the Nisqually and Skokomish rivers, and a third contemplated on the Cowlitz River, three separate and distinct watersheds, the city of Tacoma in particular, and the area served by the Northwest Power Pool in general, will benefit through increased generation, more efficient use of diversity in streamflows, and additional storage reservoir capacity.

During the coming year this utility will adopt a new machine punched card system of billing procedure which is expected to materially expedite account billings. Some form of increased rate will be authorized for electrical house heating to recover the cost of serving that type of load. It is expected that the 1949 system load growth will approximate 12% over the 1948 system growth, excluding surplus sales for resale. Much of this growth, however, is expected to come from existing customers rather than from any marked increase in the number of billings.—*J. Frank Ward, superintendent, Light Division.*

Washington Water Power

WWP spent $4,000,000 for new and improved facilities in 1948, and plans to expend an equal amount for the same purposes in 1949. A part of the general rehabilitation of the company system to expand capacity during 1948 included placing in service a new $785,000 substation in Spokane. Designated as Beacon substation, it is the largest such installation on the system and controls seven 110-kv. transmission lines feeding the area. Another major project completed during the year was the rebuilding of the Camas Prairie section of the system in Idaho, resulting in increased capacity and better service to the area.

Marked progress was made on a continuing program to rebuild distribution systems in Spokane and elsewhere on the system. In Spokane alone, more than 800 blocks of pole lines were moved from streets to alleys and cut over from 2,300- and 4,000-volt operation to 13,000-volt operation. In addi-

tion to a new tie with the Bonneville system at Beacon substation, another was effected at Lewiston, Idaho, which now gives the system four ties with BPA. 15,000 kva. of capacitors were added to the system to permit necessary power transfer and for improvement of voltage conditions. Substantial improvement and the increasing of capacity of the underground system in Spokane took place. A long-range program for elimination of all a-c underground was completed. The company's street lighting program continued as a major item of construction. System wide (with the bulk in Spokane, the area's center of population), 4,700 units of new and replaced overhead lights, and 600 units of mercury vapor went into service — a total of 5,300 units.

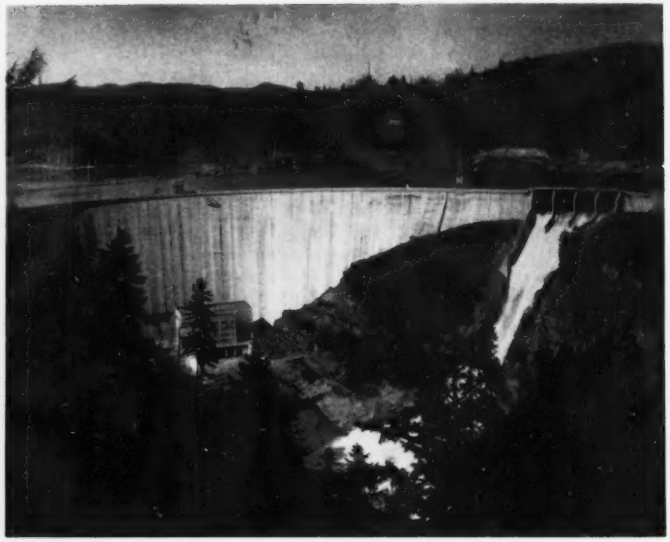
Generating capacity was increased about 10,000 kw. by the additions of flashboards at the Nine Mile, Long Lake and Upper Falls plants, the increase of storage in Lake Coeur d'Alene, deepening of the Chelan plant tailrace and the installation of an additional converted-motor at Monroe street plant. Another 20,000 kw. was picked up through special arrangements with industrial plants under a load-molding program and the use of surplus capacity from steam turbines operated by some of the industrial plants.

Transformer capacity added totaled 51,000 kva., including eight large units from 2,000 to 5,000 kva. which accounted for 30,000 kva. of the total. The remainder was made up of smaller units. Transmission additions included 50 miles of new 60,000-volt lines and the reinsulation of 15 miles to carry 60,000 volts instead of the former 22,000 volts. 245 miles of distribution lines were built including 85 miles of farm lines. Voltages range from 2,300 to 13,000. This included the installation of 1,800 units of distribution transformers representing 36,000 kva. of increased capacity. There was a net increase in meters of 6,442 for 12 months ending Nov. 30, 1948. The year 1948 was one of rearrangement of equipment and the straining of all facilities far beyond capacity in order to keep up with tremendous growth of load.

The 1949 construction program of the company will pattern out much like that of the past year. Expansion of present facilities to increase capacity will take place generally over the system. Among construction items scheduled are the completion of the 13,000-volt section of Beacon sub, the construction of a new substation in downtown Spokane designated as Metro, which will increase capacity by 25,000 kva. The modernization of more than a dozen existing substations will be further carried out with the installation of eight new transformer units; 20,000 kva. of capacitors will be installed generally over the system, and three new regulating stations will be built in the Spokane area. Street-lighting will again be a big item, with some 4,300 units being slated for both new installation and replacement of others — and another 200 mercury vapor units will be installed.

It is anticipated that some additions, not fully planned at this writing, will be made to increase storage. Transformer capacity will be increased by approximately 64,800 kva.; 12 miles of new 110,000-volt line from Spokane to Medical Lake, and the reinsulation of 25 miles of 60,000-volt line from Moscow to Lewiston, Idaho, for 110,000 volts, will be carried out; 250 miles of distribution lines — ranging from 2,300 to 13,000 volts — will be constructed, including about 1,000 blocks of rebuild in Spokane; 2,275 units of distribution transformers will be installed, amounting to about 38,000 kva. of increased capacity.

It is estimated that 5,000 new customers will be added to the system, resulting in approximately 160,000,000 kwh. of increased load. As during the past year, generating capacity to meet continued growth of load will still constitute a serious problem. Receipt of ordered material and the availability of man power will still be limiting factors to full-scale expansion of facilities.—*J. E. E. Royer, vice-president and general manager.*



50,000-kw. Alder Dam power house of Tacoma City Light is part of 114,000-kw. Nisqually power development. Next hydro development planned is on Cowlitz

Wyoming

Missouri River Basin Proj., USBR

Seven dams are already under construction on this project, the largest of the basin-wide developments of the Bureau of Reclamation. An additional 15 dams are to be placed under construction in 1949 to further the over-all plan which is to bring flood control, irrigation, and other benefits to the vast basin area.

Boysen Dam and power plant have been under construction since the latter part of 1947 and are scheduled for completion in 1952. The power plant is to house two main 7,500-kva. generating units. Construction on the Kortes Dam and the 30,000-kw. power plant is approximately 50% complete. Canyon Ferry Dam and power plant are expected to be readvertised soon.

Construction of transmission lines from Alliance to Gering, Gering to Sidney, Sidney to Sterling, Cheyenne to Pine Bluffs, and Glendo to Lusk, totaling 248 miles, was started in 1948 and is to be completed early this year. Specifications have been issued for construction of the Casper-Gering and Fort Randall-O'Neill transmission lines, totaling 223 miles. Construction should start by early spring.

Diversion channel that is part of the Bridge River project of British Columbia Electric Railway Co. First of the three 45,000-kw. units is now in operation

New street lighting was an important activity of Washington Water Power

Canada

B. C. Electric

Total expenditures on electrical plant account by B. C. Electric, mainland system, approximated $20,000,000 during 1948. System hourly peak reached 250,900 kw. The Bridge River hydro plant was officially opened on Oct. 23, 1948, when the initial unit of 62,000 hp. went into operation. Other phases of this project completed during the year were the diversion dam in the Bridge River Valley, diverting water through a 13,200-ft. tunnel to penstocks on the side of Mission Mt. overlooking the power house on the shore of Seton Lake, and a 130-mile, 230-kv. transmission line to permit delivery of plant output to the Vancouver area.

Receiving facilities at Horne Payne substations were provided to tie in with the subtransmission system. As major links in this subtransmission system an overhead 60-kv. circuit, approximately eight miles in length, was brought into service between Kidd substation on the north arm of the Fraser River and the existing Burnaby substation to the eastward, and the first of two underground 60-kv. cable circuits between Horne Payne and Murrin substations, approximately 4.4 miles in length, thus comprising the second installation of such cable of oil-filled type in the past two years. Completion of these two links has permitted conversion of certain existing circuits from 34 to 60 kv. and the creation of one circuit of the ultimate 60-kv. double-circuit ring, some 30 miles in length, around the Burrard Peninsula.

A 15-mva., 3-phase transformer, stepping down from 60 kv. to 12 and 4 kv., was added at Kidd substation to increase capacity there for distribution purposes to 30 mva. and a similarly rated unit was provided in a temporary installation at the site of a new station, to be called Sperling, in the western area of the city.

Distribution substations of 3,000 kva. initial capacity each were brought into service in the Fraser Valley, one in Chilliwack, one in Surrey and one in Langley municipality. Conversion of distribution in the valley area from 2.3 kv. to 6.9/12 kv., common neutral, proceeded in conjunction with the new substation construction.

A new rectifier substation housing two 1,500-kw. units of glass-bulb type went into service to provide d-c power for street railway and new trolley coach service in the city area. One new trolley coach route went into service during the year and one route was converted from street car to trolley coach operation.

Radio facilities in the 150-megacycle band went into service for fixed point-to-point communication and for mobile radio service, and a new trouble office was created to handle all trouble calls for the electricity and gas distribution systems.

Two additional 62,000-hp. units at Bridge River are on the program for 1949, one to be completed in March and one in October. Construction is also proceeding on a storage dam in the upper Bridge River Valley, approximately 40 miles above the recently completed diversion dam. The first stage of this storage dam at La-Joie Falls, involving the placing of approximately 700,000 cubic yards of rock fill with concrete facing on the upstream side, will provide sufficient storage for operation of the first three Bridge River units.

Additions to Horne Payne substation in Vancouver will comprise a second 66-mva., 3-phase receiving transformer, a 30-mva. synchronous condenser, switching facilities for distribution to the subtransmission system, and switching and transformer facilities for local distribution. The new permanent Sperling substation, to have an ultimate capacity in excess of 60 mva., will be undertaken early in the year. Transformer facilities at Murrin substation will be increased by the addition of a fourth 25-mva 3-phase unit. Two additional 3,000-kva. distribution substations will be constructed in the Fraser Valley. Two existing substations in the city area will be reconstructed and equipped with automatic rectifier plant, replacing rotary equipment, to supply d-c power for transit services. Four streetcar routes are scheduled for conversion to trolley coach operation.—*T. Ingledow, vice-president, chief engineer.*

A FLOCK of pheasants were seen on the bank of a frozen creek in Idaho. They had to dig fast and furiously to reach the ground for food under the snow blanket. That is what business will be like in 1949. It is there to be had, but it will take digging for it.

Before the "big freeze" that enveloped all of the West in January, questionnaires were sent to all the electric utilities of this region and the reports are recorded here in tables and comments. How much the results of the unprecedented cold spell will affect the economy of the region is still too early to appraise. The evidence of loss of crops, damage to trees and live stock losses is highly dramatic and makes headlines. Sober second judgment often tempers these first estimates and compensating factors often alleviate the economic setback.

As an example, farmer income may hold despite the crop and stock losses because of increased prices for the remaining produce. Thus the entire nation will share the loss by paying higher prices but the relative purchasing power of all will remain stable.

At the end of the year past and beginning of this year a much more competitive business situation had developed. "Pipelines" of appliances and equipment had filled even local warehouses. The backlog of demand had been satisfied. Business would again have to be created—by sales persuasion, by replacement of outmoded equipment, by handling of traded-in wares in a way not to lose money on them, by better control of inventory, more careful management, improved personnel efficiency and by advertising and sales promotion. In other words, "normal" selling had returned.

The value of these reports, statistics and intentions, therefore, has not been impaired very much. They still measure the market possibilities, record the pattern of accomplishment in each area, and enumerate the assistance that will be given to all sales by the serving utilities. The kilowatt-hour consumption figures prove that this West is still the most highly electrified region in the U. S. if not the entire world. It is thus the best market. The following reports and tables bear study and careful use in development of the opportunities they point to.

Appliance Promotions

Essential to an understanding of the appliance information condensed in the charts on the following pages, is an elaboration of the conditions that have affected the past year's sales performance of Western utilities. Particularly in the Northwest, power shortages have curtailed sales activities. Pertinent too is the sizable population growth on the Pacific Coast, which has tended to increase the number of domestic customers served, and in some instances has been a determining factor of power shortages.

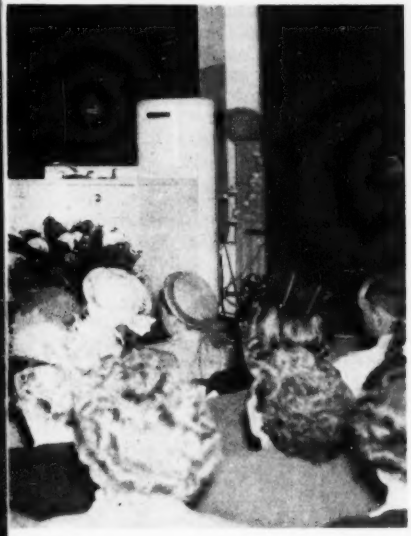
Statistics have been computed from the answers to the *Electrical Merchandising* questionnaire sent out in October and the figures derived from the ELECTRICAL WEST questionnaire which followed. In some cases figures from the two questionnaires differ because of later figures received by ELECTRICAL WEST. In the interim certain changes within the utilities have taken place. California Electric Power Co. reports a decrease in its domestic customers and appliance sales due to the sale of Arizona properties to the Arizona Edison Co. In the case of Puget Sound Power & Light Co., the final figures on the number of domestic customers served has dropped slightly due to changes in fringe properties sold to public utility districts since October.

The company reports are incorporated in the following summaries:

Alameda Bureau of Electricity does not merchandise appliances. The utility reports that the majority of dealers in its territory have an adequate staff of salesmen. Appliance deliveries are not yet normal, says G. A. Baxter, secretary. Consumer resistance to appliance prices is evident.

Anaheim Light & Power Department has no plans for merchandising appliances. The dealers have an adequate staff of salesmen. Superintendent V. W. Hannum declares that appliance deliveries are not normal and consumer resistance to appliance prices is apparent.

Arizona Edison Co. does no merchandising of appliances, but renders every help possible to local dealers to enable them to sell, says J. L. McDonald, new business manager. It



Public Service Co. of Colorado.

DIG FOR GOLD IN '49

trains the dealers personnel, demonstrates appliances on the dealers floor, presents special programs in the company offices on the use of appliances, and participates in distributor shows. The company does special window displays featuring dealers' merchandise, uses newspaper and radio advertising directed to promote the sale of dealers' merchandise. Special campaigns are planned on ranges, freezers, water heaters, roasters, electric bedcoverings and lighting. There is an adequate staff of salesmen for the dealers. Salesman's training is provided by distributor and utility representatives. Appliance deliveries are 75% better than last year. Consumer resistance to prices is still noticeable.

The utility employs one traveling home economist and four male representatives. The economist spends three months in each town in the territory, conferring with high school domestic science groups, women's clubs, civic organizations, and presenting programs featuring electrical merchandise. She gives special training to the dealers' personnel and advises new business representatives on latest appliances. The four men give consumer advice on purchase and operation of equipment and perform services to help the dealers sell.

British Columbia Electric Railway at Vancouver reports that the power supply situation is slightly easier. However, due to recent heavy snow and cold weather in the territory, the company officials are asking heavy industries to cooperate by directing their heaviest power loads away from the peak hours. For the first time since 1939, the utility is slanting its promotional efforts more towards direct load building. Doing no merchandising, the company will conduct special campaigns on water heaters and blankets, but feels that the supply situation on ranges and freezers will not warrant promotions.

The high dealer mortality rate recorded by the company is due to the relative shortage of Canadian-made appliances and the embargo on American-manufactured appliances. "This has resulted in many hardware, furniture and repair firms who did not have franchises for U. S.-made goods and who received small shipments, being placed in the position of receiving no major appliances, and therefore having to revert to their former status, that of non-electrical dealer," declares J. H. Taylor, customer services manager.

In view of the limited supply of many lines of major appliances, the company reports that the majority of dealers have an adequate supply of salesmen. However, if the supply situation should brighten, there would be a shortage of trained appliance sales personnel in the territory. Salesmen's training is provided by manufacturers and distributors as well as the utility's own basic training course. Outside organizations such as the Vancouver Board of Trade and Vancouver Night School have sponsored sales training classes.

Consumer resistance to appliance prices is less noticeable since the removal of the 25% excise tax, but the continuing trend towards increased prices is starting to have its effect. Increased price resistance is definitely indicated if prices remain or increase above their present level.

British Columbia Electric Railway at Victoria does no merchandising and reports that appliance sales are up 50% over 1947. The area served by the company has experienced a population increase of about 60% since 1939. Home building is necessarily active but increasing costs are tending to discourage those who can get by with existing accommodations, reports A. W. J. Smith, customer services manager.

Power is available on Vancouver Island for normal expansion. The dealer situation is sound in relation to present conditions. Dealers are having no difficulty in disposing of available merchandise with the exception of radios and, to a lesser degree, washers. The utility will promote electric blankets. The majority of dealers do not have an adequate staff of salesmen. Distributors, as well as the company, provide salesmen's training. Appliance deliveries are not yet normal. There is no evidence of consumer resistance to appliance prices.

Burbank Public Service Department, according to J. W. Fitzpatrick, domestic appliance section, reports consumer resistance to present appliance prices. The dealers have an adequate staff of salesmen. Appliance deliveries are not normal.

California Electric Power Co. will merchandise ranges and water heaters only. Dealers in the territory do not have an adequate staff of salesmen. Salesmen's training is provided by distributors. Appliance deliveries are not yet normal, and consumer resistance to appliance prices is apparent, says J. G. Neal, merchandising manager.

California Oregon Power Co. does not merchandise appliances, but will promote adequate wiring. The power company and manufacturers provide salesmen's training. Appliance deliveries are not normal. There is some consumer resistance to appliance prices, according to D. A. Runyard, sales manager.

California Pacific Utilities Co.'s report indicates an increase in appliance sales over 1947, particularly on ranges and refrigerators, due to better deliveries. However, reports E. A. Nickelsen, commercial manager, appliance dealers are still experiencing difficulties in securing sufficient ranges and

refrigerators, especially the deluxe models. "The sale of water heaters decreased slightly over last year. There are indications that appliance sales for the last quarter of the year will approximately equal sales for the same quarter of last year, though they will have decreased by approximately 25% from the high rate of sales of the second and third quarters of this year. Reports from the field would suggest that this rate of decrease in sales might continue unless dealers become more aggressive, with the addition of more sales personnel who are properly trained to do a better selling job."

Business conditions are reported excellent throughout the territory. New homes are being built and new residence customers added at the rate of 5 to 10% per month. Consumer resistance to appliance prices, however, is evident.

Central Arizona Light & Power Co. will do no merchandising except portable lamps. However, the utility recently announced its plans of reentering the sales promotional field after almost eight years of inactivity, and will sponsor a sales training program this year, as well as a lighting campaign. Training courses on the fundamentals of selling, appliance information, and the selling of adequate lighting are being given to the utility's salesmen and home service representatives.

There is not an adequate staff of salesmen for the majority of dealers in the territory. According to A. W. Smith, residential and small commercial sales manager, appliance deliveries are normal except for refrigerators. Consumer resistance to appliance prices is apparent.

Cheyenne Light, Fuel & Power Co. will continue to merchandise appliances and will conduct special promotions this year.

Coast Counties Gas & Electric Co. will merchandise ranges, water heaters and air heaters. Says L. Wollenberger, regional sales manager, "Business conditions and population growth in our area is similar to that experienced generally throughout California. The gain in domestic electric meters is an indication of new residential construction." The company will conduct promotions on ranges and water heaters. Appliance deliveries are below normal. Consumer resistance to appliance prices is noticeable. The majority of dealers do not have an adequate staff of salesmen. Training courses for salesmen in the territory are provided by distributors.

Colorado Central Power Co. plans to merchandise ranges, freezers and ironers, and will have campaigns on ranges, freezers, ironers, blankets and lighting. There is no consumer resistance to appliance prices, according to L. L. Gann, commercial manager. Appliance deliveries are not yet normal.

El Paso Electric Co., a merchandising utility, plans no special campaigns. There is an inadequate staff of salesmen in the territory, reports its new business manager, H. A. Walsh. Salesmen's training is provided by the company when called upon. Appliance deliveries are short on well-known brands. There is evidence of consumer resistance to appliance prices.

Ely Light & Power Co. will not merchandise appliances, according to T. A. Smith, president. There is an adequate staff of salesmen for store sales only. The company is planning no promotions. Appliance deliveries are below normal.

Eugene Water Board will not merchandise appliances. In view of the rapid growth of the territory, the power supply situation is critical and will be so until at least 1951, declares H. H. King, assistant secretary. Therefore the utility will not conduct promotions.

Fort Collins Light & Power Department will do no merchandising, but will promote appliances by weekly radio and newspaper advertising. The company reports that appliance deliveries are normal. Consumer resistance to appliance prices is noticeable, says G. H. Palmes, manager.

Frontier Power Co., according to George Warren, electrical engineer, will not merchandise appliances, and plans no special promotions. There is not an adequate staff of salesmen for the majority of dealers. Appliance deliveries are not yet normal. There is no consumer resistance to appliance prices.

Glendale Public Service Department will do no merchandising or promoting of appliances, says George D. Hastings, commercial agent. Appliance deliveries are below normal. There is not much consumer resistance to appliance prices.

Hawaiian Electric Co., a merchandising utility, will put special effort this year behind freezers, dishwashers, disposers and complete kitchens, according to C. E. Nolan, vice-president and promotional manager. "Home building is continuing at a rapid rate. Appliance sales have held up remarkably well until the recent strikes on the island, which are bound to have a decided effect on appliance sales and many of the distributors and dealers are feeling the pinch." The utility is working in cooperation with the Electrical Development Advisory Service. Campaigns will be held. There is consumer resistance to appliance prices. Appliance deliveries are not normal.

Employing nine home service girls, the company has an active program outlined for its home service department. Weekly cooking classes are presented in the company auditorium. School demonstrations are given either in the school or in the department. Home economists are available at all times to present demonstrations and lectures to club groups. Dealers and salesmen attend participation meetings held in the department. A film library is maintained for the company. A home economist visits every purchaser of a major appliance to explain its use. Complete plans are drawn up for new or remodeled kitchens to meet the wishes of the homemaker. A residential lighting specialist will call at any home and advise on lighting problems. A weekly radio program "Kitcheneering in Hawaii" is presented by members of the staff. The department prepares newspaper articles, pamphlets, recipe sheets, as well as providing a telephone service designed to answer homemakers' problems. Every bride receives an invitation to the department for a wedding present, consisting of a recipe box of 45 tested recipes, Reddy Kilowatt apron, and assorted literature. A complete tour of the home service department is included.

Helper City Municipal Corp. will not merchandise appliances in 1949. The majority of dealers in the territory do not have an adequate staff of salesmen. Appliance deliveries are almost normal. There is no consumer resistance to appliance prices.

Hilo Electric Light Co. will merchandise the complete lines of two well-known brands of appliances, and is attempting to cooperate with all dealers to maintain a harmonious dealer set-up. N. H. Callard, general manager, commenting on business conditions, says: "The future on the Island of Hawaii is somewhat obscure due to the fact that our principal economy is based on sugar, and the low price of sugar on the Mainland, plus high labor costs, has caused one sugar plantation to go out of existence. Obviously this will have a marked effect on the money circulating on the Island of Hawaii, which would upset the immediate future plans for greater use of electrical appliances. On the other hand, there is a great deal of new home building and the desire of younger home own-

ers to enjoy the comforts and conveniences of electrical appliances. In Hilo alone for the first eight months of 1948 we had a 40% increase in kilowatt-hours sold for residential purposes over the same period of 1947."

The company reports no power shortage. Campaigns will be conducted on ranges, water heaters, washers, clothes dryers, roasters and ovens. Appliance deliveries are practically normal with a few exceptions. To a comparatively small extent, consumer resistance to appliance prices is evident.

The company plans to set up a home demonstration program in the near future contingent upon the procurement of personnel.

Home Gas & Electric Co. will not merchandise appliances this year, but will cooperate with dealers on promotions. Appliance deliveries are not normal, according to O. G. Kirk, advertising manager.

Idaho Power Co. will merchandise all major and small appliances, and particularly those needing promotion. Campaigns are planned on ranges, freezers, water heaters, blankets and small appliances, says E. A. Olson, sales manager. The majority of dealers in the territory have an adequate staff of salesmen. Electrical distributors provide salesmen's training. Appliance deliveries are not quite normal. There is some consumer resistance to appliance prices.

Imperial Irrigation District, doing no merchandising, will conduct campaigns on ranges, freezers and water heaters. There is an inadequate staff of salesmen for the majority of dealers in the territory. Salesmen's training is provided only by dealers. Appliance deliveries are not normal. There is no consumer resistance to appliance prices, according to Paul Post, commercial power superintendent.

Customers and Consumption

Utility Territory	Average Annual Kwh. Consumption — Residential					Customers — Residential — Urban Customers		Rural Customers		Commercial	
	1948	1947	1946	1945	1944	1948	1947	1948	1947	1948	1947
Alameda P.U. Dept.	1,556	2,625	1,480	1,416	1,344	12,750	12,590	....	....	1,441	1,401
Anaheim L. & W. Dept.	1,000	1,000	....	750	700	4,050	3,878	....	....	1,040	987
Arizona Edison	890	....	1,100	....	....	17,330	14,590	173	150	....	....
Ashland Mun. L. & P.	3,960	....	....	....	....	2,200**	2,100**	....	....	....	....
B.C. Electric Ry., Vancouver	1,810	1,450	1,318	1,089	1,089	106,000	100,499	35,000	29,875	22,300	19,406
B.C. Electric Ry., Victoria	1,500	1,425	1,336	1,218	1,062	22,698	21,543	6,841	5,654	4,500	4,218
Burbank P.S. Dept.	1,591	1,550	....	....	....	22,444	21,500	....	....	....	....
Calif. Elec. Power	1,720	1,450	1,476	....	1,300	26,520	24,166	14,280	13,013	6,650	6,491
Calif. Oregon Power	3,975	3,590	3,228	2,886	3,024	51,063†	46,000†	....	....	11,763	10,682
Calif. Pacific Utilities	2,540	2,240	1,760	1,664	1,494	17,331†	15,910†	....	....	4,019	3,750
Central Ariz. L. & P.	1,811	1,689	1,569	1,452	1,324	....	....	....	....	9,589	7,941
Cheyenne L. Fuel & P.	1,505	1,500	1,400	....	....	7,896†	7,715†	....	....	1,263	1,200
Coast Counties G. & E.	1,461	1,450	1,250	....	943	13,342	12,742	17,427	15,889	5,485	5,296
Colorado Central Power	1,400	....	....	....	....	9,092	8,216	4,161	3,801	1,340	1,234
Colorado Springs P.U. Dept.	....	1,325	1,092	1,190	1,142	....	....	....	....	....	....
El Paso Elec.	1,680	1,610	1,557	1,445	....	37,623†	35,454†	....	....	....	....
Ely L. & P.	960	892	....	....	....	1,273	1,260	3	1	304	298
Eugene Water Board	5,200	5,000	4,400	3,800	3,424	14,506†	13,298†	....	....	2,241	1,934
Fort Collins L. & P. Dept.	1,510	....	....	....	....	4,533	4,371	....	....	1,023	961
Frontier Power	880	896	761	....	....	6,009	5,892	1,078	933	1,200	1,156
Glendale P.S. Dept.	1,500	1,600	1,400	1,320	1,291	30,200	29,000	....	....	4,500	4,200
Grays Harbor PUD No. 1	2,301	2,593	1,800	....	....	9,969*	9,778	2,499*	2,320	....	....
Hawaiian Elec.	2,400	2,125	1,932	1,791	1,647	55,264†	52,581†	....	....	14,128†	12,064†
Heber L. & P.	....	1,600	....	....	....	....	400†	....	....	....	....
Helper City Mun.	1,500	....	....	....	....	....	900	....	....	....	....
Hilo Elec. Light	1,400	....	....	....	....	5,000	4,720	5,500	5,354	....	....
Home Gas & Elec.	2,020	....	....	....	....	6,116	5,844	2,652	2,531	1,341	1,281
Idaho Falls Elec. Light	....	5,600	....	....	....	....	4,500†	....	....	....	....
Idaho Power	3,815	3,400	2,900	2,550	2,457	60,000	57,900	29,800	24,700	13,000	12,700
Imperial Irrig. Dist.	3,400	2,400	....	....	2,078	12,200	11,570	6,350	5,775	3,600	3,392
Logan, City of	2,540	....	....	2,334	2,258	4,412**	4,162**	....	....	....	....
Los Angeles Dept. W. & P.	1,505	1,470	1,375	1,220	1,135	519,000	497,000	....	....	118,500	112,500
Modesto Irrig. Dist.	2,400	2,500	....	2,250	2,148	5,300	5,190	10,000	8,781	3,050	2,990
Montana Power	1,670	1,469	1,325	1,165	1,117	82,000	78,461	12,100	10,764	14,400	13,982
Mountain States Power	3,000	2,700	2,100	1,875	1,763	68,575	62,950	13,800	12,525	11,700	10,971
Pacific G. & E.	1,620	1,607	1,495	1,345	1,227	718,224	686,123	233,297	207,901	257,275	243,374
Pacific P. & L.	3,920	3,700	2,673	2,150	1,978	90,300	101,844	22,600	19,918	20,000	19,159
Palo Alto, City of	1,500	....	....	....	....	7,236†	....	....	....	1,161	....
Pasadena L. & P. Dept.	1,590	1,515	1,380	1,280	1,241	34,831	30,535	....	....	4,089	3,731
Payson Mun. Elec. L. Dept.	2,500	....	....	....	....	1,500**	1,200**	....	....	....	....
Portland Gen. Elec.	4,553	3,800	3,197	2,633	2,373	96,927	94,000	68,932	63,360	19,390‡	18,143‡
Price Light Dept.	3,600	....	....	....	....	2,300**	2,200**	....	....	....	....
Provo P.U. Dept.	2,000	1,712	2,412	....	1,368	6,169	....	....	....	736	....
P.S. of Colo.	1,350	1,219	1,087	975	906	143,000	133,468	11,700	8,837	23,500	22,166
P.S. of N.M. (Albuquerque)	1,092	1,000	900	....	....	31,000**	26,019**	....	....	....	....
P.S. of N.M. (Deming)	1,044.4	968	885	....	....	1,291	1,182	143	118	712	626
P.S. of N.M. (Las Vegas)	1,020	908	830	....	....	2,550†	2,400†	....	....	435	411
P.S. of N.M. (Santa Fe)	960	780	880	....	....	6,650	6,000	600	400	....	....
Puget Sound P. & L.	3,840	5,150	2,660	2,685	2,389	230,000†	243,068†	....	....	27,000	29,375
Raton Public Service	1,676	....	....	1,038	....	2,544	2,436	....	....	....	....
Riverside L. Dept.	1,620	1,416	1,800	1,260	1,200	13,285	12,647	....	....	1,601	1,547
Sacramento Mun. Util. Dist.	1,885	1,838	....	....	....	38,581	33,848	24,538	23,866	10,500	....
Salt River Valley Water Users	3,200	2,900	2,200	....	....	....	....	19,100	14,513	....	....
San Diego G. & E.	1,647	1,541.3	1,444.5	1,337.5	1,246.8	103,600	97,928	29,000	25,454	22,512	21,228
Seattle City Light	5,070	4,525	4,099	3,556	3,246	97,660	94,058	....	....	14,980	14,458
Sheridan County Elec.	1,050	1,055	960	851	824	4,300	4,100	575	350	....	....
Sierra Pacific Power	2,869	2,800	2,520	2,257	2,066	16,112	14,962	3,250	3,006	3,555	3,309
So. Calif. Edison	1,382	1,400	....	1,216	1,146	652,000	596,593	26,100	26,350	118,200	109,118
So. Colorado Power	1,510	1,409	1,300	1,148	1,124	25,000	23,908	2,750	2,595	3,600	3,499
So. Nevada Power	8,253	6,800	5,816	4,580	4,534	7,513	6,700	....	....	....	....
So. Utah Power	6,000	....	....	....	....	4,000	3,800	100	100	....	....
Southwestern P.S.	1,085	....	....	....	....	11,969**	10,402**	....	....	....	....
Springville Mun.	2,520	....	....	....	....	1,650**	1,600**	....	....	....	....
Tacoma City Light	5,700	5,100	4,500	4,178	3,640	43,305	42,001	....	....	5,106	4,953
Telluride Power	1,776	1,000	850	850	800	5,458	5,260	1,000	960	550	550
Tucson G. E. L. & P.	1,617	1,560	1,431	1,275	1,711	11,839	11,121	16,953	13,057	5,374	4,506
Uintah Power	2,350	....	729	925	875	415	388	215	196	....	....
Utah P. & L.	2,314	1,996	1,770†	1,559	1,386	140,540†	133,842†	....	....	15,340	14,670
Vallejo E. L. & P.	1,275	1,288	1,248	....	....	11,363†	11,578†	....	....	1,582	1,616
Washington Water Power	4,709	4,201	3,767	3,168	2,661	77,500	74,088	16,500	15,375	12,900	12,264
Western P.S. Co.	1,234	1,300	....	....	....	3,560	3,490	22	20	590	590

† Includes rural customers. * As of Sept. 30, 1948. ‡ Includes industrial customers. ** Total residential customers.

Logan City Municipal Electric Light Department does not merchandise and plans no specific promotions. This area suffers somewhat from a power shortage, says Clifton Haws, superintendent.

Los Angeles Department of Water & Power reports that the dealer picture has remained exceptionally sound. During the year only 30 out of its 600 dealers went out of business. Radio combinations and television, as well as recordings, have helped considerably. The dealers are building sales organizations, asking for prospects, inquiring as to discount practices of their competitors, closing out their little known brand name merchandise. Some of them are buying large display spaces for advertising price reductions as high as 30% on last year's models, as well as large trade-in allowances on new models. A few dealers have gone back to store demonstrations with some excellent results, particularly with home freezers.

There has been a marked trend toward decentralization of business in the territory, the effect of which has brought more business to neighborhood dealers. General business conditions are reported to be good. Population growth and home building activity appear still to be on the up-grade.

The department's own promotional plans are not as yet formulated. However, it is highly desirous of high load factor and off-peak loads, which means the promotion of electric bedding, freezers, water heaters and, to a limited extent, ranges.

The department enjoys a favorable position regarding the availability of power. With two new steam units soon in operation, the department will be protected from any immediate danger of a power shortage.

In addition to four home service girls, the department employs two senior home economists for large-scale demonstrations and techincal work, and one home economics aide.

Dealer salesmen training is conducted by the department in conjunction with the Southern California Radio & Electrical Appliance Assn. Appliance deliveries are normal, with the exception of deluxe models. There is a noticeable consumer resistance to appliance prices.

Modesto Irrigation District does not plan to merchandise appliances. According to J. M. Grigsby, electrical engineer, appliance deliveries appear to be normal.

Montana Power Co., doing no merchandising, will conduct general promotional work. Salesmen's training is provided by the utility as well as manufacturers and distributors. Appliance deliveries are not yet normal. There is evidence of consumer resistance to appliance prices.

Mountain States Power Co. has no program for merchandising. There is not an adequate staff of salesmen for the majority of dealers, says A. W. Trimble, vice-president and treasurer. Appliance deliveries are normal on water heaters, vacuum cleaners, radios and irons, but not on other appliances. There is apparently no consumer resistance to appliance prices.

Pacific Gas and Electric Co. does not merchandise. It has no specific campaigns planned, but will tie-in with promotions of the Northern California Electrical Bureau. Electric ranges and refrigerators are still in short supply, particularly in rural areas, the company reports. Price resistance is beginning to appear. From O. R. Doerr, general sales manager, comes the following statement on general business conditions: "The northern and central California market for electrical appliances is expanding rapidly.

"The 46 counties of northern and central California, comprising the Pacific Gas and Electric Co. service area, continue to grow in population and to enjoy a continuing high level of prosperity. This area now has approximately 5 million population (about 50% of the state), with an increase of about 150,000 people during the year.

"Approximately 60,000 new homes were constructed during 1948, which is an all-time high—representing 6% of the new homes built during the year in the nation as a whole. All factors point to a continuation of new residential construction on a comparable level for the year 1949.

"Continuing with our long-standing policy of extending electric service to previously unserved rural areas, approximately 15,000 new rural customers were added during 1948.

"The market outlook for the sale of household appliances in northern California is generally better today than it was a year ago. Income payments, savings and employment are at all time highs—with continuing new residential construction and increased population adding to the potential market.

"With the advent of television broadcasting for northern California, we will have an opportunity to merchandise a completely new appliance with a tremendous market potential. In consideration of the prevailing high level of economy for this territory, television set sales for 1949 should exceed 15,000 residential installations—with practically unlimited possibilities for the future.

"Another comparatively new appliance with a tremendous unit sales potential is the home freezer. The great variety of vegetable and fruit seasonal crops in northern California offers an excellent opportunity for effective utilization of this appliance, which has already shown a widespread customer appeal.

"In discussing the appliance market outlook, price levels are an important point of consideration. The consumer today is price conscious. Aggressive salesmanship will be required to maintain a large volume of appliance sales. This is particularly true of the rural areas, which are faced with the probability of lowered farm produce prices, and which constitute a large proportion of the northern and central California potential appliance market."

Pacific Power & Light Co., suffering from a power shortage, reports that its efforts are not as aggressive as they would be if it had ample power and were actively building load. Says D. B. Leonard, sales manager: "The sales problems are even more acute in a period of curtailment and our staff will be very busy working with customers and dealers in our attempts to mold load to the maximum benefits of everyone in the area."

The company will do no merchandising with the exception of lamp bulbs. Salesmen's training is provided by the utility as well as manufacturers and distributors. Appliance deliveries are normal. There is a noticeable consumer resistance to appliance prices, the company reports.

Pasadena Municipal Light & Power Department will not merchandise. Appliance deliveries are not yet normal, and consumer resistance to appliance prices is evident. According to E. L. Bettannier, general manager and chief engineer, "Pasadena has enjoyed a substantial increase in population during the past years and the purchasing power of its citizens is among the highest of the nation. At the present time, we are faced with a power shortage the same as most of the utilities in California. This situation is expected to be corrected during the next twelve months. We are doing no load promotional activities at this time."

Portland General Electric Co. does not merchandise, has no data on appliance sales, and plans no promotions at this time. Appliance deliveries are not yet normal, and a very definite consumer resistance to appliance prices is evident.

Price Light Department does not merchandise, but reports that the electrical stores in the area are making big sales on water heaters, ranges, and home freezers.

Provo Department of Utilities sells no appliances, but plans promotions on ranges and water heaters, says Elmer A. Jacobs, superintendent.

Public Service Co. of Colorado has no available information on appliance sales. It will merchandise ranges, water heaters, ironers, dishwashers, disposers, Certified Lamps, freezers, blankets and comforters. The Denver School Board, through the Opportunity School, cooperates with the company and Rocky Mountain Electrical League on salesmen's training. Appliance deliveries are not normal. Consumer resistance is apparent on appliance prices.

Public Service Co. of New Mexico, serving Albuquerque, Deming, Las Vegas, and Santa Fe, does no merchandising of appliances. In general no promotions are planned, appliance deliveries are not normal, and consumer resistance to appliance prices is evident.

Puget Sound Power & Light Co. is also suffering from a power shortage. Reports Pat Johnson, vice-president, "In order to make the most efficient use of all power resources and facilities available, all utilities, public and private, and the federal government, joined at the beginning of the war in pooling their facilities and electric energy. In spite of the great saving and improved efficiency of such operations, there will be a power shortage this winter. This situation has developed as a result of unprecedented growth of the Pacific Northwest, and there has been only a very limited amount of firm power capacity brought into production during the past several years.

"Business is riding along on a period of high prices, limited profits and high wages, construction cost is high and the backlog of requests for new electric connections continues at a high average, along with current population increases. Along with this increase is an increase in appliance retail and wholesale stores which reflects an approach to a more competitive selling area. Strikes and weather have slowed up regional developments. The direct effects of the floods last spring are well known. In addition to immediate property damage, they slowed production of electric power, which continues to be one of our outstanding problems."

Although the company does not directly promote appliances, it encourages its employees to purchase ranges and water heaters. Its report on the number of residential customers for 1948 is less than reported for last year, due to the sale of some fringe properties to public utility districts. Likewise, the figure varies slightly from the *Electrical Merchandising* report received in October, the latest report being a decrease of about 2,000 residential customers, due to changes in fringe properties sold to public utility districts.

Raton Public Service Co. reports that it will not merchandise appliances in 1949. Appliance deliveries are not normal and consumer resistance to appliance prices is evident.

Sacramento Municipal Utility District, doing no merchandising, will promote water heaters and traffic appliances. Other campaigns will depend on the ability of the system to handle the load. Appliance deliveries are not normal, but are improving. There is no consumer resistance to appliance prices reported. The staff of salesmen is barely adequate for the majority of dealers. From Daniel K. Coyle, general sales manager, comes the following report on the general outlook: "The general prosperity of our region is on a rather high level. Here, as elsewhere, the high living costs have somewhat reduced the dollar volume available for purchase of appliances in the average family. Home building has held up very well during the past year with over 4,000 new homes completed in Sacramento County. The population growth is continuing its upward climb and shows no signs of decreasing its present rate.

"We purchase all of our electricity from the Pacific Gas and Electric Co. and the general power shortage which they have experienced has affected our sales and promotional activities significantly. Also, the fact that the system capacity and the shortage of construction labor have limited our sales promotion activities in keeping with our ability to serve.

"Our sales policy is definitely 100% cooperation with dealer and manufacturer and distributor. Our backlog of unfilled requests for service has been reduced to a point where it is very gratifying, and it is our hope that, unless a power shortage intervenes, we can do some very active promotion of ranges, water, and domestic appliances by April or May of 1949. During the year we expect to promote adequate wiring very actively and gradually

To assist dealers sell slow-moving radios, the Intermountain Electrical Assn. staged big dealer meetings and sponsored window displays and advertising with the "Radio in Every Room" theme, like that shown of Royles Radio Co.

accelerate appliance promotions in cooperation with our dealers in increasing tempo, limited only by their ability to deliver and our ability to serve."

Salt River Valley Water Users Assn., according to O. L. Norman, general manager, serves a territory that is entirely rural and scattered over the major portion of three counties. Due to this fact, in that the purchasing of electrical appliances is done at many different places in the several communities it serves, it is unable to keep in touch with merchandising conditions. Due to shortage of power, no efforts are being made to increase the sale of appliances. At some future date this picture may change.

San Diego Gas & Electric Co., doing no merchandising, reports that its promotions will cover all major appliances, radio, table appliances and home lighting. Much of the promotional work in this area is carried on by the Bureau of Radio & Electrical Appliances of San Diego, in which the utility participates. There is not an adequate staff of salesmen for the majority of dealers. Salesmen's training is provided by the bureau. Appliance deliveries are not normal, and consumer resistance to appliance prices is evident.

Seattle Department of Lighting reports that it will handle no residence load promotion for the present. It is now completely out of appliance selling. P. C. Spowart, sales manager, reports: "The Northwest is concerned with a possible electric power shortage that can materialize through failure of generation machinery or a prolonged period of less than normal rainfall. All utilities of the area are intertied with Bonneville for the mutual benefit derived from the combined generation capacity.

"Seattle City Light is proud of its position to strengthen this pooling of power. Through expenditure of over $24,000,000 in the last five years for plant expansion, we have kept in stride with the great increased utilization of electricity. A new $50,000,000 construction program is under way to add 450,00 kw. of new hydro power.

"The gain in electric ranges and automatic tank water heaters on the lines this year will approximate 6,500 and 8,000 respectively. We anticipate the same increase for 1949. We will not merchandise the electric range and automatic tank water heater for the present. However, in the future it will be necessary to return to active residence load building to obtain additional revenue that will offset plant expansion."

Sheridan Division, Montana-Dakota Utilities Co. will merchandise all elec-

Appliance 1948 Sales and 1949 Quotas

	REFRIGERATORS			FREEZERS			RANGES			WATER HEATERS			WASHERS					
													Conventional			Automatic		
	1948 Sales	1949 Quotas	% Sat.	1948 Sales	1949 Quotas	% Sat.	1948 Sales	1949 Quotas	% Sat.	1948 Sales	1949 Quotas	% Sat.	1948 Sales	1949 Quotas	% Sat.	1948 Sales	1949 Quotas	% Sat.
Alameda P.U. Dept.	400	450	80.0	150	100	26.0	180	200	26.0	16	20	5.0	150	180	95.0	100	150	95.0
Arizona Edison	1,440	...	50.0	150	...	50.0	250	...	50.0	150	...	75.0	800	...	40.0	600	...	40.0
Ashland Mun. L. & P.	...	...	...	...	...	...	...	...	...	...	...	35.0	...	...	...	...	...	...
B.C. Electric Ry., Vancouver	5,500	6,000	29.2	125	150	19.6	4,250	5,000	19.6	1,450	2,750	5.65	11,500	14,000	67.5	1,350	2,000	67.5
B.C. Electric Ry., Victoria	1,100	1,100	27.7	34	50	18.4	800	950	18.4	175	500	7.0	2,100	2,000	64.1	120	300	64.1
Burbank P.S. Dept.	...	...	75.0	...	...	...	...	...	18.0	...	...	7.0	...	...	95.0	...	...	95.0
Calif. Elec. Power	600	...	85.0	100	...	30.0	500	300	30.0	450	250	18.0	200	...	98.0	100	...	98.0
Calif. Oregon Power	6,125	4,900	70.0	500	400	50.0	5,000	4,000	50.0	3,850	3,080	45.0	3,675	2,940	...	420	336	...
Calif. Pacific Utilities	1,813	2,000	72.0	160	150	38.0	1,418	1,200	38.0	1,345	1,500	28.0	2,700	3,000	...	250	500	...
Cheyenne L. Fuel & P.	1,450	1,750	...	200	250	...	500	625	...	800	1,000	...	2,420	2,000	90.0	400	520	90.0
Coast Counties G. & E.	500	600	75.0	300	400	...	500	600	20.0	300	400	15.0	600	600	...	300	500	25.0
Colorado Central Power	600	750	88.0	45	75	...	130	250	25.0	306	400	14.0	300	350	25.0	60	150	77.0
Elec. Bond & Share	5,400	...	80.0	470	...	...	1,100	...	27.0	850	...	15.0	...	...	77.0	...	...	...
Ely L. & P.	40	...	80.0	10	...	...	25	...	70.0	10	...	95.0	10	...	80.0	50	...	80.0
Eugene Water Board	...	...	...	...	...	...	...	...	73.0	...	...	...	...	...	...	...	...	...
Fort Collins L. & P. Dept.	500	500	50.0	200	200	40.0	300	300	40.0	150	200	15.0	250	300	80.0	100	200	80.0
Frontier Power	250	250	60.0	25	25	50.0	250	250	50.0	200	200	10.0	200	200	60.0	30	30	60.0
Glendale P.S. Dept.	1,000	1,000	65.0	...	...	17.0	1,000	1,000	17.0	200	250	2.0	...	...	...	...	...	...
Grays Harbor PUD No. 1	...	...	...	...	...	37.94	...	...	37.94	...	...	32.75	...	...	...	...	...	...
Hawaiian Elec.	9,300	8,000	90.0	500	600	35.0	4,800	4,800	35.0	4,200	4,000	30.0	8,500	7,500	81.0	1,700	1,500	81.0
Hawaiian Mun.	100	...	90.0	10	...	5.0	...	...	50.0	100	...	15.0	30	...	90.0	...	...	90.0
Home City Gas & Elec.	1,200	...	90.0	210	...	675	...	...	50.0	192	...	15.0	...	...	90.0	703	...	90.0
Idaho Power	8,510	9,000	85.0	1,241	1,241	9,999	10,000	10,000	70.0	6,096	6,096	45.0	2,178	2,178	85.0	3,853	3,853	85.0
Imperial Irrig. Dist.	2,000	2,500	70.0	350	400	1,000	1,200	1,200	35.0	600	650	25.0	1,500	...	80.0	500	...	80.0
Los Angeles Dept. W. & P.	...	...	75.0	...	...	7,200	6,000	6,000	7.6	4,000	5,000	3.5	...	...	...	...	...	...
Modesto Irrig. Dist.	...	...	75.0	...	...	...	...	...	30.0	...	...	10.0	...	...	...	...	...	...
Montana Power	...	...	75.0	...	...	5,500	5,500	5,500	32.0	3,000	3,000	6.5	...	...	...	...	...	45.0
Mountain States Power	...	...	75.0	...	...	...	...	...	37.0	...	...	37.0	...	...	...	...	...	...
Pacific G. & E.	87,513	95,000	73.0	11,161	15,000	16,505	19,000	19,000	42.0	8,935	10,000	27.4	85,406†	85,000†	...	...	...	72.0
Pacific P. & L.	17,468	...	72.0	2,050	...	15,500	...	...	40.0	9,275	...	38.0	12,210	...	...	4,130	...	80.0
Pasadena L. & P. Dept.	...	...	75.0	...	...	900	1,100	1,100	11.2	130	200	3.0	...	...	...	...	...	...
Portland Gen. Elec.	...	...	70.0	...	...	...	...	...	60.0	...	...	45.0	...	...	...	...	...	73.0
P.S. of Colo.	...	...	...	480	...	...	...	...	...	520	...	...	...	...	...	...	...	...
P.S. of N.M. (Deming)	50	...	75.0	15	...	20	...	...	5.0	5	...	5	10	...	30.0	10	...	30.0
P.S. of N.M. (Santa Fe)	300	...	70.0	150	...	75	...	...	47.0	25	...	5	350	...	80.0	150	...	80.0
Puget Sound P. & L.	30,000	28,000	70.0	...	...	26,000	28,000	28,000	...	16,000	19,000	36.0	...	...	60.0	...	...	60.0
Riverside Dept. Util.	...	...	...	...	...	681	...	...	...	109	...	...	...	...	...	...	...	...
Sacramento Mun. Util. Dist.	6,000	6,000	...	700	1,000	1,600	2,000	2,000	...	1,100	1,500	...	8,500†	8,500†	...	...	...	...
San Diego G. & E.	16,750	17,000	...	4,200	5,000	3,500	3,600	3,600	10.0	3,000	3,000	8.0	12,600	12,000	...	6,000	7,000	...
Seattle City Light	...	...	...	...	...	8,000	8,000	8,000	77.0	8,000	8,000	48.0	...	...	...	...	...	...
Sheridan County Elec.	50	...	...	15	...	25	...	...	...	10	...	...	10	...	...	50	...	...
Sierra Pacific Power	1,447	1,600	70.6	...	...	995	1,100	1,100	56.9	630	750	22.8	...	...	...	...	...	...
So. Calif. Edison	40,027	50,000	70.0	5,200	10,000	10,507	10,500	10,500	24.0	3,926	4,800	7.0	46,000†	55,000†	...	...	...	60.0
So. Counties Gas Power	1,600	2,000	70.0	158	200	500	600	600	24.0	306	400	7.0	1,786	1,800	435	500	...	25.0
So. Nevada Power	1,600	...	90.0	150	...	1,100	...	...	60.0	500	...	60.0	1,200	...	490	...	...	85.0
So. Utah Power	75	...	90.0	25	...	75	...	...	30.0	100	...	30.0	100	...	20	...	...	90.0

| | | |

Dealers Cooperation Programs

Utility Territory—(Dealer association or cooperative league in the area—in parenthesis)	Utility Merchandises Yes	Utility Merchandises No	DEALERS Present Number	DEALERS Number Prewar	DEALERS 1948 Increase	DEALERS Number Failed	No. of Customers Per Dealer	Utility Sales or Cooperative Program	No. Girls	Home Service Program
Alameda P.U. Dept.		X	8	5	2		1,593	Electric range and water heater campaigns.	0	
Anaheim L. & W. Dept.		X	12	12			337	None.	0	
Arizona Edison		X	79	65		0	221	Train dealers personnel; demonstrations, campaigns, special programs, window displays, ad helps.	1	Schools, women's club. Training to dealer personnel. 4 male reps. (See story.)
Ashland Mun. L. & W. Dept.		X	12	6			183	None.		
B. C. Electric Ry., Vancouver (B. C. Div. Can. Assn. Radio & Appl.)		X	240	125		48	587	Basic dealer training course; campaigns on water heaters and electric blankets.	6	Group meetings, dealer appl. demonst., home calls, kitchen and laundry planning.
B. C. Electric Ry., Victoria (Dealer Div. Dept. & League)		X	60	18		6	492	Salesmen's training; electric blanket campaign.	2	Appliance demonst. homes, schools, women's groups, films, dealer sales training, kitchen, laundry planning.
Burbank P.S. Dept. (Burbank Elect. Appl. Dlrs. Assn.)		X	24	18		10%	935	Campaigns on ranges, freezers, water heaters and electric blankets.	1	Home and school demonstrations.
Calif. Elec. Power	X		200	55	0	5	204	Selling ranges and water heaters; promoting sales on all major appliances through dealers.	4	Postsale demonst., cooking schools, schools, help on dealer demonst., complaint calls.
Calif. Oregon Power		X	180	150			283	Salesmen's training, adequate wiring promotion.	1	Schools, home demonstration.
Calif. Pacific Utilities		X	113	63	12	0	153	None.	1	Home service, demonst. for dealers, women's club meetings.
Central Ariz. L. & P.		X	250	225		3-5	202	Selling portable lamps, sales training course, campaigns on ranges, freezers, water heaters, lighting.	4	New customer calls, new appl. demonstrations in home, cooking schools.
Cheyenne L. Fuel & P.	X		37	10	6	1	212	Salesmen's training; special campaigns.		
Coast Counties G. & E. (NERA)	X		130	57	8	0	236	Selling ranges, water heaters, air heaters, campaigns on ranges, water heaters.	1	School demonstrations, county fairs, women's clubs, home calls.
Colorado Central Power	X		24	12		1	552	Selling ranges, freezers, ironers; campaigns on ranges freezers, lighting, ironers, blankets.	0	
El Paso Elec.	X		131	62	4	0	287	Salesmen's training.	2	Range demonstrations, school home economics classes.
Ely L. & P.		X	7	5		1	183	None.	0	
Eugene Water Board		X						None.	0	
Fort Collins L. & P. Dept.		X	25	20	5	0	181	Radio and newspaper advertising.	0	
Frontier Power		X	27	14	0	2	262	None.	0	
Glendale P.S. Dept.		X	60	10-12		5	503	None.	1	
Grays Harbor PUD No. 1		X						None.	0	
Hawaiian Elec. (Elect. Dev. Advisory Service)	X		175	75	29		315	Electrical Dev. Advisory Service. Selling major and traffic appliances, special campaigns.	9	Cooking classes, school-club demonst., movies, home calls kitchen planning. (See story.)
Helper L. & P. Dept.		X	7	7		0	128	None.	0	
Hilo Elec.	X		35			0	300	Selling major and traffic appliances, dealer cooperation, wiring department, campaigns.	0	
Home Gas & Elec. (Rocky Mt. Elect. League)		X	34	9		2	263	Campaigns in cooperation with dealers.	2	Home demonstrations, cooking schools, major appliance demonstrations.
Idaho Power	X			400	18			Selling all major and traffic appliances; campaigns on ranges, freezers, water heaters, electric blankets.	2	Dealer calls, group meetings and demonstrations.
Imperial Irrig. Dist.		X	50	35	0	5	371	Campaigns on ranges, freezers, water heaters.	0	
Logan, City of		X						None.		
Los Angeles Dept. W. & P. (So. Cal. Radio & Elect. Appl. Assn.)		X	624	180	20	30	829	Electric bedding, water heater, freezer, and range campaigns.	7	Home calls, dealer demonst., radio programs, education programs, school instruction.
Modesto Irrig. Dist.		X	35	20			437	None.	0	
Montana Power		X	468	350		7	201	Salesmen's training; general promotion featuring ranges, refrigerators, freezers, water heaters.	5	Customer service, appliance promotion through dealers and dealers sales training.
Mountain States Power		X	215	175	0	10	383	None.	0	
Pacific G. & E. (No. Cal. Elect. Bur.)		X	2,100	1,321	72		451	Tie-in with promotions of No. Calif. Elect. Bureau.	9	Work with groups to educate customers regarding advantages of appliances.
Pacific P. & L. (N.W. Appl. Ret. Assn.)		X	575	375	30	0	176	Dealer and customer cooperation, salesmen's training.	3	Appliance demonstrations and home lighting.
Pasadena L. & P. Dept. (Pasadena Radio & Elect. Dlrs. Assn.)		X	75	30	4	5	464	None.	1	
Payson Mun. Elect. Light Dept.		X	6	3			250	None.		
Portland Gen. Elec. (N.W. Appl. Ret. Assn.)		X	385	200		8%	429	Salesmen's training through medium of EEI basic sales training courses.	2	Demonstrations to new range users, distribution home economics bulletins, etc.

Provo P.U. Dept. (Intermt. Elect. Assn.)	X	21	14	...	...	347	Campaigns on ranges and water heaters.	2	Cooking demonstrations in Denver and outside districts, follow-up of new range sales.
P.S. of Colorado (Rocky Mt. Elect. League)	X	126	52	3	13	1,227	Salesmen's training; campaigns on freezers, ironers Certified Lamps, electric blankets.	0	
P.S. of N.M. (Deming)	X	7	3	0	0	204	None.	0	
P.S. of N.M. (Las Vegas)	X	12	10	2	0	212	None.		
P.S. of N.M. (Santa Fe)	X	15	8	...	1-2	483	None.	0	
Puget Sound P. & L.	X	800	300	50	16	287	None.	4	Dealer cooperative program.
Raton Public Service	X	5	3	...	0	508	Advertising to promote sales for dealers on major appliances.	0	
Riverside L. Dept.	X	20	8	3	1	664			
Sacramento Mun. Util. Dist. (Sacramento Elect. Club)	X	140	120	...	2%	450	Promote adequate wiring, appliance promotions in cooperation with dealers.	1	Dealer and customer contacts; demonstrations.
Salt River Valley Water Users	X	...	...	...	...	...	None.	0	
San Diego G. & E. (Bur. Radio & Elect. Appl.)	X	400	250	5%	5%	331	Promotions on all major appliances, radio, table appliances, home lighting.	2	Group demonstrations and classes for special groups.
Seattle City Light (Assn. Appl. Dirs.)	Y	...	...	...	...	...	Salesmen's training in cooperation with jobber.	3	Cooking schools on range and food preservation.
Sheridan County Elec.	X	8	4	...	0	609	Salesmen's training; range, freezer, washer, and commercial lighting promotions.	1	Dealer cooperation.
Sierra Pacific Power	X	118	65	3	3	164	None.	1	Calls through dealers and customers, contact new range users.
So. Calif. Edison	X	1,174	400	-252	...	577	Dealer meetings, salesmen's training; adequate wiring promotion, special campaigns.	6	Home calls, women's club programs, school demonstrations, training dealer salesmen.
So. Colorado Power (NEPA & Elect. League)	X	57	25	...	6	486	Salesmen's training; promotions on freezers water heaters, kitchen and laundry.	1	Demonstrations.
So. Nevada Power	X	16	8	...	2	468	None.	0	
So. Utah Power	X	14	5	...	0	292	None.	0	
Southwestern P.S.	X	20	8	...	...	598	Advertising, dealer relations, customer contacts.		
Springville Mun.	X	7	3	...	...	235	None.		
Tacoma City Light (Tacoma Appl. Retailers Assn.)	Y	...	...	...	...	...	Selling ranges and water heaters.	1	Demonstrations.
Telluride Power (Intermt. Elect. Assn.)	X	36	14	0	0	179	Promotions on ranges, freezers, and electric blankets.	0	
Tucson G. E. L. & P.	X	32	18	...	...	899	None.	1	Home demonst., kitchen planning, lighting.
Uintah P. & L.	X	8	4	...	1	78	Range and freezer campaigns.	0	
Utah Power (Intermt. Elect. Assn.)	X	600	450	...	...	234	Salesmen's training; campaigns on ranges, freezers, water heaters, lamps, table appliances.	7	Cooperation with dealers, jobbers, and schools.
Vallejo E. L. & P.	X	8	5	...	...	1,400			
Washington Water Power (Inland Emp. Elect. Dirs. Assn.)	X	375	290	7	2	250	Salesmen's training.	12	Customer range demonstrations and dealers salesmen's training.
Western P.S. Co.	X	13	8	2	0	275	Selling all appliances except radios.		

course on how to sell home freezers. Sales results have been most satisfactory. Electric ranges and water heaters are having an unprecedented acceptance, the principal obstacle to still further sales being the high cost of wiring.

"We have sponsored a series of three dealer meetings on ranges, water heaters and home freezers respectively. We are also continuing an active program of adequate wiring promotion with 20 men in the field calling upon new home builders, architects and contractors.

"The market for all types of electrical equipment in this territory is very promising, although the public is becoming much more selective and better selling methods will be required from now on because the competition for the consumer's dollar is getting to be very keen from industries as well as our own."

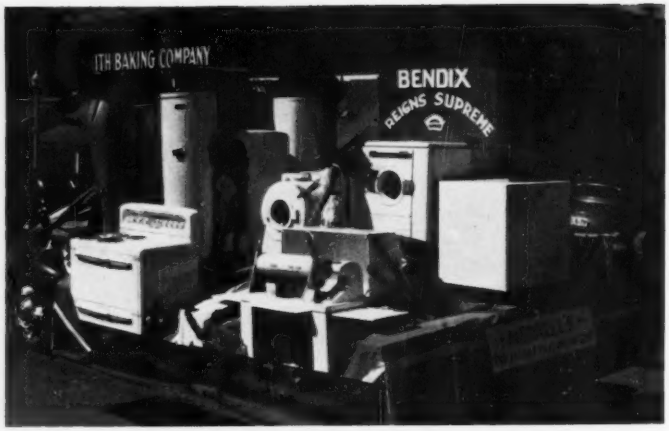
Southern Colorado Power Co. will merchandise ranges, refrigerators, water heaters, home freezers, dishwashers, disposers, laundry equipment, lamps and table appliances. The company provides salesmen's training. Campaigns are planned on freezers, water heaters, complete kitchens and laundry. Appliance deliveries are not normal. Consumer resistance to appliance prices is evident, reports E. H. Pemberton, supervisor of sales promotion.

Southern Nevada Power Co. does not merchandise, and will not conduct any promotions because there is a shortage of power in the area. Reports S. J. Lawson, general manager, "Our locality is still very prosperous, home building has slowed down some, but is still continuing at a good pace. Our population growth continues steadily. There is a power shortage here in the southwest and appears to be in the section until 1951, but has not affected the appliance situation here yet. Our local dealers handle merchandising nicely."

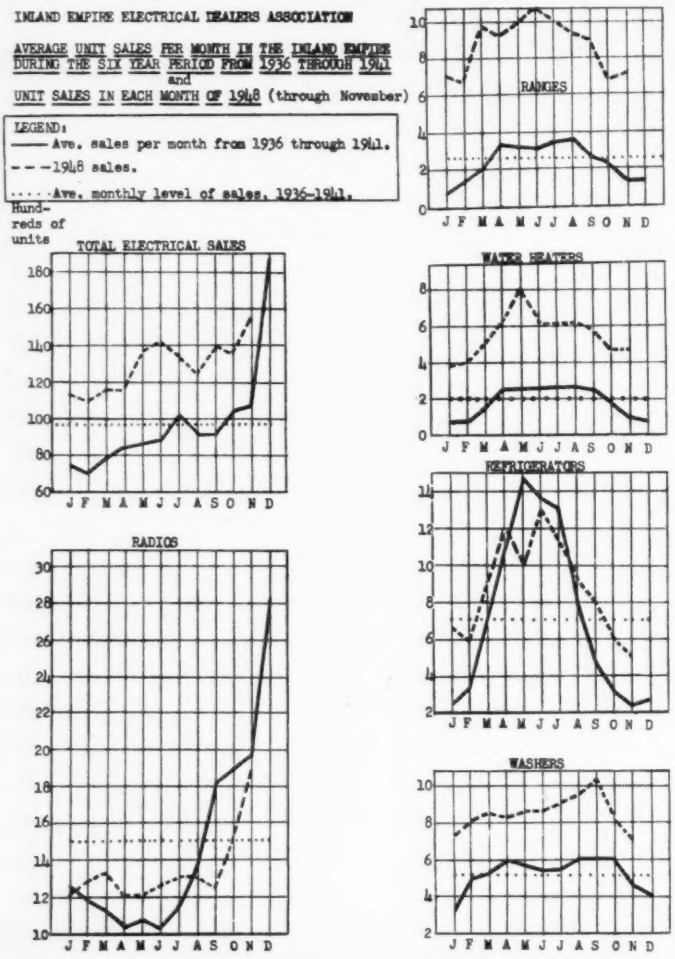
Tacoma City Light will merchandise ranges and water heaters. Appliance deliveries are not normal in all lines, and consumer resistance to appliance prices is apparent, reports J. Frank Ward, superintendent, light division.

Telluride Power Co. has discontinued its merchandising of appliances, according to W. O. Cluff, sales manager. It will conduct promotions on ranges, freezers and blankets. Appliance deliveries are normal on everything but refrigerators. Consumer resistance to appliance prices is noticeable.

Tucson Gas, Electric Light & Power Co. does not merchandise and has no available information on appliance sales from dealers. Appliance deliveries



Dealers, like Merrell Motor & Equipment Co. of Blackfoot, Idaho, brought appliances into open in parades and county fairs to reawaken buying urge


INLAND EMPIRE ELECTRICAL DEALERS ASSOCIATION
AVERAGE UNIT SALES PER MONTH IN THE INLAND EMPIRE DURING THE SIX YEAR PERIOD FROM 1936 THROUGH 1941
and
UNIT SALES IN EACH MONTH OF 1948 (through November)
LEGEND:
—— Ave. sales per month from 1936 through 1941.
- - - 1948 sales.
.... Ave. monthly level of sales, 1936-1941.
Hundreds of units
TOTAL ELECTRICAL SALES
RADIOS
RANGES
WATER HEATERS
REFRIGERATORS
WASHERS
J F M A M J J A S O N D

are not completely normal. There is not much evidence of consumer resistance to appliance prices. On the general outlook, A. R. Seaman, commercial manager, comments: "Tucson is experiencing quite a growth in population and in home building. We have had locally a number of building projects varying from a few units to one project that has a potential for the construction of 3,000 moderately priced homes. We have a number of projects which vary from around 100 to 400 units, and prospects of more to come.

"It is obvious that we, the utility company, are faced with quite an extensive program for expansion in order to meet the rising demand for power. Our expansion program is under way, and we expect to spend in the neighborhood of $11,000,000 during the next five years on this program.

"Our race to have additional power to meet this ever-expanding demand for power no doubt does affect some classes of appliance merchandising. Very definitely we cannot hope at this time to participate in any sort of electric range or water heating sales activity. However, we can say that generally there has been no material restraint imposed upon the local appliance dealers. We are trying to meet their requests in every way possible under the existing conditions."

Utah Power & Light Co. will not merchandise in 1949, but will direct its sales efforts primarily towards promoting appliances which it considers in the competitive field. The majority of dealers in the territory do not have an adequate staff of salesmen. The company, together with manufacturers, jobbers, and the state vocational school, provides salesmen's training. Appliance deliveries are normal on some items. There is a limited consumer resistance to appliance prices. Says W. A. Huckins, sales manager, "General business conditions in the territory we serve continue to be prosperous. Population growth is on an upward trend. Home building in our region continues on a high level and this condition should carry through 1949.

Valuable statistical help is given to dealers in the Spokane area through the excellent reports issued by the Inland Empire Electrical Dealers Assn. This shows that sales since the war follow prewar patterns closely seasonally

Washington Water Power Co. reports that the serious power shortage in the area will curtail or eliminate any promotional efforts on the part of the utility. The company does no merchandising and plans no specific campaigns. Appliance deliveries are normal on water heaters and radios. To a small extent there is consumer resistance to appliance prices. Louie C. Aston, sales promotion manager, says: "The prosperity trend of the Inland Empire continues upward with no indication of change in 1949. The large increase in population still holds the housing situation at a critical point in spite of the fact that many homes are being built."

Western Public Service Co. plans to merchandise all appliances with the exception of radios. It will conduct promotional campaigns on ranges and water heaters.

Commercial Cooking

With the power situation still critical in many areas on the Pacific Coast, the number of utilities promoting commercial electrical cooking is necessarily few. A short summary of the companies who do plan promotional work follows:

British Columbia Electric Railway at Vancouver plans no special promotion, but reports that it will continue to pursue aggressively every prospect and is making use of all appropriate literature to this end.

British Columbia Electric Railway at Victoria declares that, since the delivery periods of electric cooking equipment are still poor, it will carry on a general long-range promotion rather than any sales drives.

California-Pacific Utilities Co. will furnish contractor-dealers with prospects and catalog materials on available equipment.

Fort Collins Light & Power Department plans to furnish part of the installation cost, promote advertising, and provide a cooking school.

Hawaiian Electric Co. will promote commercial cooking by advertising, direct sales and dealer helps.

Idaho Power Co. will conduct a special promotion on cooking and baking.

Los Angeles Department of Water & Power will continue its promotion of commercial cooking with a staff of five sales engineers, and suitable advertising.

Montana Power Co. will carry on its program with year-round sales contacts made by eleven commercial sales advisors.

Pacific Gas and Electric Co. will promote further utilization of electric counter appliances, including deep-fat fryers, grills, toasters, coffee makers, waffle irons, etc.

Portland General Electric Co. will carry on normal promotional activities of one commercial cooking specialist only.

Provo Department of Utilities reports that it has supplied schools with electric ranges and will continue to do so.

Public Service Co. of New Mexico, Las Vegas, plans to use newspaper advertising to assist local dealers.

Sacramento Municipal Utility District will carry on a limited direct-mail campaign with personal follow-up in cooperation with electrical equipment dealers.

San Diego Gas & Electric Co. will promote commercial cooking in non-gas territory.

Southern California Edison Co. will have three men working in this field, will use direct-mail advertising, and promote dealer cooperation.

Telluride Power Co. plans to promote commercial cooking by personal contact and direct mail.

Utah Power & Light Co. will conduct special activities throughout the year.

Western Public Service Co. will sell counter cooking equipment.

Wiring Costs, Promotion

An important factor in considering the market for electric ranges, water heaters and other major energy-using appliances is the cost of installation. Some companies work energetically to keep the installation price down. Others partially underwrite the cost. What the various utilities are doing about this problem is summarized in the following:

Alameda Bureau of Electricity contributes $40 toward range wiring, and reports that installation costs interfere with range sales. It has no adequate wiring promotion planned.

Arizona Edison Co. declares that installation costs do not seem to interfere with the sale of ranges. The company does not finance range installation, but has representatives in the field who give consumer advice on purchase and operation of equipment.

British Columbia Electric Railway at Vancouver says that installation costs do not interfere with the sale of ranges at present due to the great scarcity of ranges, but reports that this situation would change rapidly if ranges were in ample supply. This year the company is more concerned with installation costs of electric storage

San Diego NEWS PRESS Radio Guide

A WEEK OF RADIO PROGRAMS FROM ALL SAN DIEGO RADIO STATIONS — APRIL 23 to 30, 1949

Take this full week's Radio Guide out of the News Press and keep it on your radio.

RADIOTORIAL . . . .

Today's Guest Writer:
Oscar Thompson

Subject:
Good Reception Pays Off

OSCAR THOMPSON

Only a few short years ago one radio, operated by batteries and with horn attachment, served the whole family. That one radio cost plenty, too—about as much as a modern radio and phonograph combination. "In the good old days" there was little variety in radio entertainment, compared with the wide range of entertainment, news, sports and occasional choices available to 1948 listeners. That's why one radio served its day pretty well.

Not so today! Billy must listen to the "Lone Ranger" or a ball game. At the same time Mother wants to tune in on her favorite recipe program. Then Dad's choice of news commentators about invariably comes at the same time as Sis's "Sinatra." Of course, there's only one answer—a radio in every room—kitchen, work shop, den, bedroom, but most important of all a really fine radio-phonograph combination for the living room. The 1948 radio-phonograph combination, in which is built all the "know-how" that was born of intensified experimental endeavors throughout the war, is now perfected for home use. It's certainly a must for perfect radio enjoyment.

There's one type of radio entertainment on which the entire family agrees—good music. The rich tone values of the better combination capture the full meaning of the numbers and acts as a tonic to the ambitions and sociability of every listener. Fortunately, the good music hours, via radio, are increasing. But if you can't tune in a symphony the minute you want it—just press the button and the automatic record player is on the job for the special occasion.

Modern living demands the best in radio reception. It pays off in a streamlined family circle, it instils appreciation for the better things of life. It's worth the added investment!

Weekly Comments by Members of the Radio Committee of the BUREAU OF RADIO AND ELECTRICAL APPLIANCES OF SAN DIEGO COUNTY

San Diego Radio Program for Friday

Time	KFMB	KFSD	KSDJ	KSON	KGB	KUSN
6 A						
7						
8						
9						
10						
11 A						
12 N						
1 P						
2						
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10						

* Program marked with an (*) are also carried on F M 101.1 mc.

1170 KSDJ

A Familiar Star with A NEW SHOW!

PHIL BAKER QUIZ SHOW

FRIDAY NIGHT at 8:00

1170 KSDJ

Popular with the public in San Diego is a radio guide, sponsored by the Bureau of Radio & Electrical Appliances and published by a shopping news of free distribution. It supplies what other newspapers have long failed to do

water heaters. To meet this a special committee has been set up to study ways and means of keeping installation costs of water heaters at a reasonable level. The Red Seal Wiring program for the promotion of adequate wiring is conducted under the auspices of the Electrical Service League of British Columbia.

British Columbia Electric Railway at Victoria reports that installation costs have not interfered with the sale of ranges. An adequate wiring promotion is carried on in close cooperation with the Electrical Service League of British Columbia, which has undertaken an education program among electrical contractors and dealers, and is in close touch with distributors. According to A. W. J. Smith, customer services manager, "The Service League's Plan Service has been accepted widely by architects and general contractors, thus strengthening the adequate wiring publicity and education undertaken among the utility's residential customers."

Burbank Public Service Department has a reimbursement policy on range wiring costs, and reports that installation costs do not interfere with range sales.

California Electric Power Co. says that installation costs very definitely interfere with the sale of ranges. It has no program at present for meeting this. In promoting adequate wiring the company contacts architects, contractors, prospective builders and finance companies.

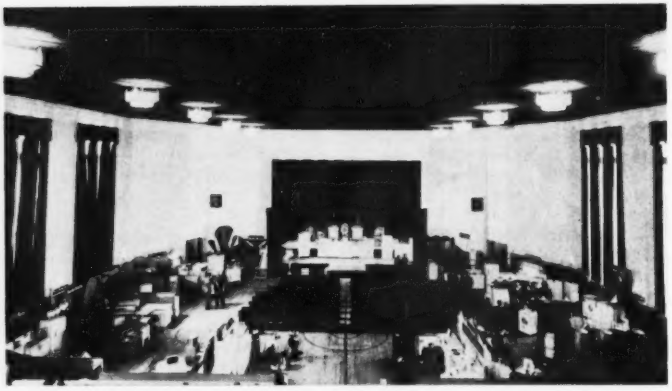
California Oregon Power Co. reports that wiring costs do not interfere with range sales. The company carries on a promotion program for adequate wiring.

California-Pacific Utilities Co. declares that a number of dealers are adding wiring electricians and appliance servicemen to their staffs to meet the problem of installation costs interferring with the sale of ranges. The company assists in adequate wiring promotion by furnishing contractors, dealers, architects and home builders with adequate wiring information.

Central Arizona Light & Power Co. at present has no program for meeting the problem of range wiring costs, which it says do interfere with sales. The company has no adequate wiring promotion planned.

Cheyenne Light, Fuel & Power Co. reports that it is now organizing an adequate wiring promotion.

Coast Counties Gas & Electric Co. says that installation costs interfere with range sales, but at present has no program for meeting the problem. The company has an adequate wiring promotion under consideration.



This and the picture alongside the heading to this section were taken at the Sterling, Colo., Farm and Home Electrical Festival, last April, staged by Public Service Co. of Colorado and dealers. Above, just before the doors opened. On page 100, Maxine Mayhew, home economist presenting "food fashion parade"

Colorado Central Power Co. reports that plans are being formulated to meet the problem of wiring costs. It has no adequate wiring program.

Fort Collins Light & Power Dept. claims that installation costs interfere with the sale of ranges. In promoting adequate wiring the company carries on inspection, advertising, and dealer cooperation.

Glendale Public Service Dept. has its own range wiring program which has been in effect for years, and reports that wiring costs do not interfere with sales. The department does adequate wiring, allowing $15 on single dwellings. The consumer pays the balance of approximately $35.

Hawaiian Electric Co. says that installation costs interfere with range sales, but that constant work has brought prices down. It has no adequate wiring promotion program.

Home Gas & Electric Co. has a plan in operation to keep the installation costs of ranges down. It promotes adequate wiring through advertising.

Idaho Power Co. reports no problem of installation costs interfering with range sales. The utility carries on an adequate wiring program of day-by-day promotion, baking and cooking schools.

Imperial Irrigation District allows $35 on range wiring and $20 on water heater wiring as a paid subsidy, and reports that installation costs interfere with range sales.

Los Angeles Department of Water & Power is developing a program to meet the problem of range installation costs. Its adequate wiring program is carried on by promoting the certification plan through advertising, contractors, and 21 field salesmen.

Modesto Irrigation District promotes adequate wiring with advertisements, coupled with education of electrical contractors.

Montana Power Co. is studying the problem of installation costs interferring with range sales, but at present has no program worked out for meeting it. It carries on an advisory service for architects and builders in the promotion of adequate wiring.

Mountain States Power Co. has no specific adequate wiring program, but does some newspaper advertising and window displays on the subject.

Pacific Gas and Electric Co. reports that, to meet the problem of range wiring costs, effort is being made to channel all installation work through certain designated dealers, which will give them sufficient volume to justify lower prices. Through advertising and support of the Northern California Electrical Bureau, the company will promote the certification program of the National Adequate Wiring Bureau, and will make field contacts with individual architects and builders.

Pasadena Municipal Light and Power Department uses the department's wiring plan so has no problem of range installation costs in Pasadena.

Provo Department of Utilities' adequate wiring program is carried on through the distribution of booklets and other information outlining adequate wiring methods for prospective builders.

Public Service Co. of Colorado in its dealers' and builders' department has three men constantly contacting wiring contractors, builders and architects, providing them with literature, adequate wiring plans, and assisting them in any way possible with the objective of promoting adequate wiring. The men work cooperatively with the

Rocky Mountain Electrical League, the local agency which is authorized to issue adequate wiring certificates for the National Adequate Wiring Bureau. The company also does some newspaper and radio advertising on the subject.

Raton Public Service Co. reports that installation costs interfere with range sales and that it may have to underwrite part of the wiring cost.

Riverside Public Utilities says that adequate wiring is handled by its new business department which works with architects, contractors and prospective builders, offering advisory service in going over plans and advising them as to their wiring needs.

Sacramento Municipal Utility District reports that wiring costs interfere with range sales to some extent. Efforts to induce contractors to adopt flat-rate installation cost have met with some success. Two contractors in the area offer flat-rate range wiring. The utility will make adequate wiring one of its promotions for 1949, cooperating with the local Electric Club, which recently received the adequate wiring franchise for Sacramento.

San Diego Gas & Electric Co. declare that in some areas installation costs interfere with range sales. Dealers are encouraged to make arrangements with an electrician to install all ranges sold at a flat rate. A regular adequate wiring program is conducted by the Bureau of Radio & Electrical Appliances in cooperation with the utility.

Seattle City Light reports that installation costs interfere with the sale of ranges, but at present has no program to meet the problem. It works in cooperation with the Electric Club of Washington to raise minimum standards of the local wiring code.

Sheridan Division, Montana-Dakota Utilities Co. declares that range wiring costs interfere with sales, and that the company may absorb part of the cost.

Sierra Pacific Power Co. discarded its $35 wiring allowance last September, and reports that installation costs do not interfere with range sales. Adequate wiring promotion is carried on through the dealers only.

Southern California Edison Co. says that range installation costs interfere with sales in some areas. Where installation costs are exorbitant, every effort is made to obtain reasonable charges. In addition to newspaper, magazine, direct-mail advertising and educational meetings the utility has 26 men contacting new home builders on the promotion of adequate wiring.

Southern Colorado Power Co. promotes an adequate wiring program under the national committee, holds meetings, and carries on newspaper and radio advertising.

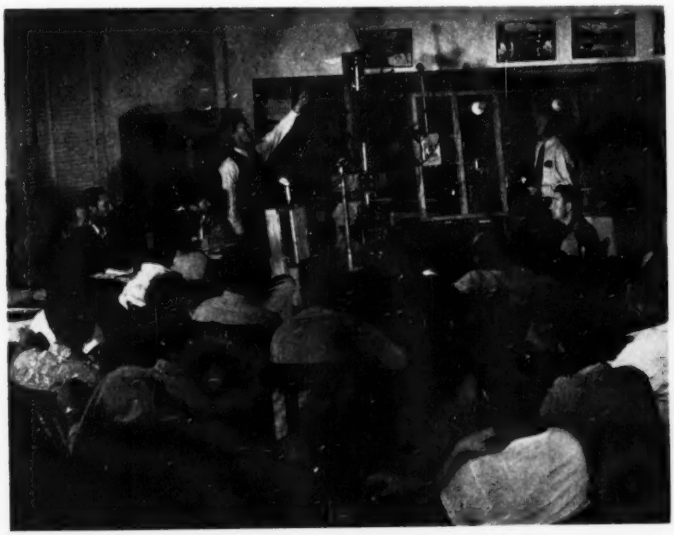
Telluride Power Co.'s adequate wiring program consists of newspaper and radio advertising.

Utah Power & Light Co. reports that installation costs have interferred with range sales in a few cases. The company carries on promotion of adequate wiring with two specialists who devote all their time to calling on builders, wiring contractors, architects, etc.

Washington Water Power Co. declares that wiring costs don't interfere with range sales very much. Its adequate wiring promotion program consists of newspaper ads, the preparation of wiring specifications, and personal contact with builders.

Western Public Service Co. carries on adequate wiring promotion through advertising.

Adequate and safe farm wiring advice was carried to rural areas by Sacramento Municipal Utility District power advisors, Felix Karrer and Bill Lehman. Demonstration panels showing proper wiring methods were used effectively



Agricultural Programs

Farm electrification is cultivated principally by the power companies serving rural areas, the REAs, and public utility districts. A brief summary of the agricultural programs planned for this year is contained in the following:

British Columbia Electric Railway at Vancouver reports that the program of its agricultural services section will be slanted more towards load building, as the power supply situation will be improved considerably in 1949. Over-all interest in all phases of agriculture will be part of the program, but more time will be spent in developing new uses for electrical equipment for the farm and in working with agricultural electrical equipment dealers.

British Columbia Electric Railway Co. at Victoria says that the plans of its agricultural section will include farm refrigeration, with emphasis on local construction of farm freezer chests; a greenhouse operation program which will be conducted in conjunction with the Dominion Experimental Station, Saanichton, B. C., in which general greenhouse heating with electricity, coupled with electric soil heating and electric soil sterilization will be experimented with; and studies in ventilation covering brooder houses, laying houses and greenhouses.

California Electric Power Co. offers its rural customers agricultural engineering service, such as pump testing and other assistance.

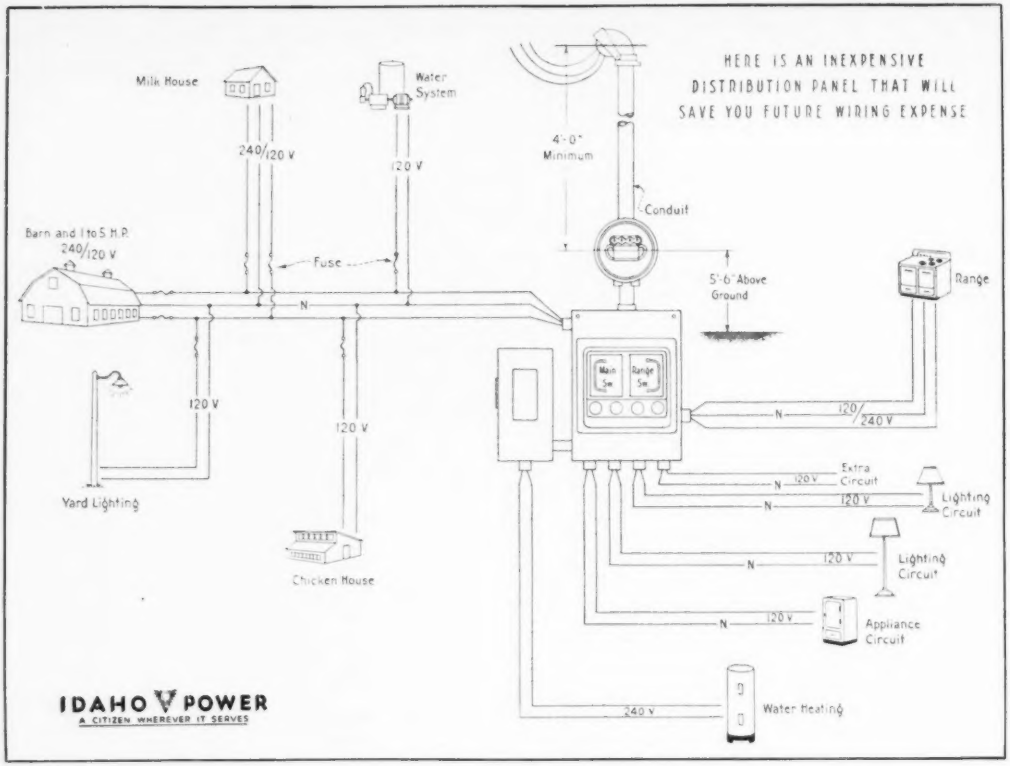
California-Pacific Utilities Co. is adding rural customers to the limit of the availability of labor and materials.

Cheyenne Light, Fuel & Power Co. has an agricultural engineering staff in the field.

Coast Counties Gas & Electric Co. employs a full-time agricultural power specialist.

Hawaiian Electric Co. gives aid to farmers through 4-H Clubs on pumping and other uses.

Home Gas & Electric Co. works



Farm wiring advice supplied to new extension customers by Idaho Power Co. It results in installation of an adequate service equipment that will be capable of taking care of future farm power electrical requirements as they arise

with 4-H leaders and the city extension department.

Idaho Power Co. will have day-by-day promotion of farm electrification, and cooperate in the 4-H program.

Montana Power Co. will provide advisory service on all phases of farm applications of power.

Pacific Gas and Electric Co. declares that during the agricultural year of 1948, 6,064 new agricultural power customers were added on the PG and E system, involving 121,244 hp. in motor installations for irrigation purposes. This represents a customer expenditure of approximately $20,000,000 for well drilling and casing, and in addition about $13,000,000 for pumps, motors and wiring equipment, says O. R. Doerr, general sales manager. It is anticipated that the 1949 volume of new agricultural business will be within 10% of the record year of 1948. A large part of this business is expected because of the general lowering of the water tables throughout the area. The PG and E pump testing service will be expanded to meet customer demands for information regarding pumping problems.

Pacific Power & Light Co. plans a development program with a field man for rural contact.

Public Service Co. of Colorado reports that seven men, most of them engineers, are working constantly on the company's agricultural program. They work with the farmers in attempting to get service extensions to unserved farms. They render engineering service to the farm customers in attempting to adapt power applications to their needs. They stress adequate wiring to take care of future requirements. In addition they work with farm youth organizations to supply them with information concerning utilization of electric power on the farms, and also cooperate with the extension personnel of the colleges.

Public Service Co. of New Mexico at Deming will give assistance on farm electrification and extend lines.

Puget Sound Power & Light Co. will cooperate with dealers and farmers on better balanced loads.

Sacramento Municipal Utility District will continue with appliance demonstrations and wiring layouts before such groups as the Farm Bureau, veteran agricultural classes and high school agricultural classes.

Salt River Valley Water Users Assn. will provide for natural increases in its agricultural program.

San Diego Gas & Electric Co. plans no program for this except a radio program and direct selling.

Southern California Edison Co. has no promotion planned, but will take all the business that comes to its lines, meet engine competition and pump testing.

Southern Colorado Power Co. will continue and expand its present plan, consisting of rural service men, "Go-All Electric" campaign, and radio and newspaper promotion.

Utah Power & Light Co. says that plans for its agricultural program are completed, but will not be carried out until additional personnel is available.

Washington Water Power Co. will aid in the promotion of 4-H clubs,

electric clubs, and will cooperate with college farm extension service.

Electric House Heating

Depending primarily on its ability to serve the load, utilities are accepting or discouraging electric house heating throughout the West. In the Northwest most companies are discouraging this form of heating because of the strain it would create on generating capacity. In California a number of the utilities are accepting but not actively promoting such business. The following answers were given on the question of whether individual companies are accepting or discouraging electric heating for houses:

Alameda Bureau of Electricity is accepting electric house heating and sharing in the wiring costs.

Anaheim Light, Power & Water Department is accepting this type of business, and reports that an accumulative rate applies for houses with heating.

British Columbia Electric Railway at Vancouver last year filed an alternative residential rate which permits the use of electric house heating. The rate has since been revised to make the demand charge applicable to all customers whose demand exceeds 10 kw, regardless of whether the load is space heating or not. The company does not encourage space heating, however, and points out to its customers that this is a luxury form of heating and that they must expect to pay more for it than any other fuel on the market. "The rate which we have set may discourage many customers from using house heating," says J. H. Taylor, customer service manager, "although it is only designed to give us a return commensurate with the cost of trying to serve this type of load."

British Columbia Electric Railway at Victoria is discouraging electric heating.

California Electric Power Co. is accepting the load but not actively promoting.

California Oregon Power Co. is accepting this type of business in a few locations where capacity per units is available.

California-Pacific Utilities Co. accepts all electric heating. It encourages heat pump installation, discourages other electric house heating installations, but reports that some installations are being made.

Central Arizona Light & Power Co. is accepting it, but not promoting it. It does not discourage the business except on comparative cost estimates with natural gas.

Coast Counties Gas & Electric Co. accepts electric house heating but insists on engineered layouts and attic insulation.

Ely Light & Power Co. discourages electric heating for houses.

Eugene Water Board is discouraging electric heating and has raised the rate to 1.6c over 1,000 kwh. This rate does not apply to the present installations for a five-year period.

Fort Collins Light & Power Department is discouraging this business and reports that to date there is nothing out that it considers economical.

Frontier Power Co. says that electric house heating is not yet considered in that territory.

Glendale Public Service Department says that it explains in full the cost of electric house heating, why it is somewhat higher than other types of fuel heating, and the advantages of electricity.

Idaho Power Co. is discouraging this business except reverse-cycle of refrigeration on the heat pump.

Imperial Irrigation District is accepting and finds reverse-cycle equipment very desirable. It provides 3-phase service in most residential areas because of many 3-phase all-year air conditioning installations.

Los Angeles Department of Water & Power is accepting but not promoting. It endeavors to supply customers with factual information on this heating.

Modesto Irrigation District is accepting but not campaigning actively on electric house heating.

Montana Power Co. accepts this business.

Mountain States Power Co. is refusing to serve any new business.

Pacific Gas and Electric Co. says that electric home heating will not be promoted at this time.

Pacific Power & Light Co. is discouraging the business because of the power shortage.

City of Palo Alto is accepting such business but requiring the use of load regulators. It plans to make a study of possible revision of the rates for this service.

Pasadena Municipal Light & Power Department is discouraging electric house heating because it is an undesirable load.

Portland General Electric Co. discourages such business.

Provo Department of Utilities is discouraging it because at the low rate consistent with heating houses it would create too much strain on its generating capacity.

Public Service Co. of Colorado says electrical heating is impractical in that area, with low-priced natural gas in abundance and high degree days.

Public Service Co. of New Mexico at Las Vegas is accepting such business but no large-scale heating is contemplated.

Puget Sound Power & Light Co. is discouraging it because of the Pacific Northwest power curtailment program.

Riverside Public Utilities is accepting some electrical heating but makes no effort to promote it with the exception of bathroom heating.

Sacramento Municipal Utility District accepts electric house heating. It also gives advisory and planning service to owners, architects and builders, including the proper insulation and weather stripping of homes.

Salt River Valley Water Users Assn. is accepting it and says it is a natural growth.

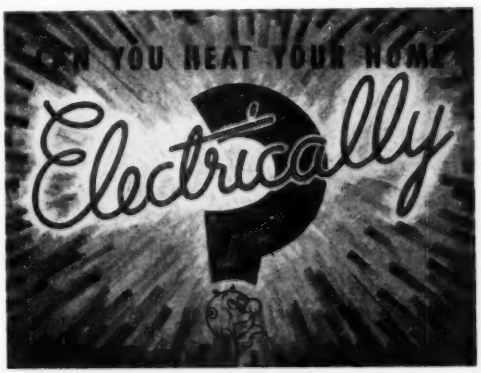
San Diego Gas & Electric Co. is accepting but not encouraging such business.

Seattle City Light says that, because of the power shortage, electric heating of homes is a non-essential use of electricity.

Sierra Pacific Power Co. is discouraging electric heating for houses.

Southern California Edison Co. is discouraging it and says that it does not recommend electric space heating in the territory, as it now appears uneconomical both to the customer and the utility.

Southern Colorado Power Co. is dis-



To answer the increasing number of questions regarding electric heating of homes, B.C. Electric has prepared an attractive brochure handling the entire matter very capably

couraging electric heating. Load is coming on as fast as the company can build for it, and costs are pyramiding, it reports.

Tacoma City Light is strongly discouraging electric heating for houses through advertising and counter contacts.

Utah Power & Light Co. says that it has made an installation of reverse-cycle refrigeration, and tests will determine its future policy in this regard.

Vallejo Electric Light & Power Co. is accepting electric heating.

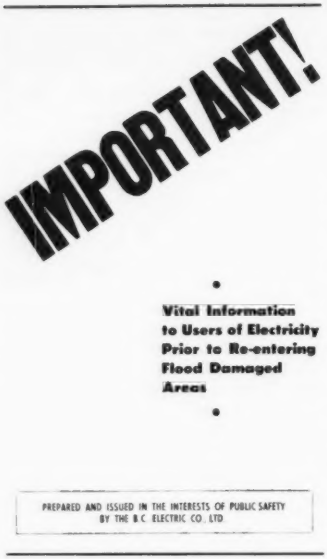
Washington Water Power Co. is discouraging such business, due to cost, but will serve if demanded.

Western Public Service Co. is accepting and soliciting business.

Lighting Programs

In the field of lighting Western utilities are still guided somewhat by their ability to serve increased loads, particularly at the peak periods, as most lighting requires. Policies on residential, commercial, industrial and school lighting vary with individual companies. While some utilities aggressively promote all phases, others concentrate on particular fields of lighting. Some companies follow the "Planned Lighting Program." Much effort too is being devoted to work with architects, contractors, engineers and customers, making plans and layouts and giving advisory service. As reported in the questionnaire the following answers were given by the utilities on their activities in the lighting field:

British Columbia Electric Railway at Vancouver, planning an active lighting promotion, will start early this year mailing a planned lighting brochure to commercial stores in its territory. The brochure, adapted from the EEI material, has been redone by the utility to include local examples of good store lighting. Company sales representatives in the course of their daily calls will note the names of stores which look like prospects for good lighting. A series of three mailings will then be sent to these prospects, followed by a personal call from a sales representative. The mailings offer the services of the company's lighting section. This campaign may be followed up later in the year with a similar promotion on industrial lighting.


IMPORTANT!
Vital Information to Users of Electricity Prior to Re-entering Flood Damaged Areas
PREPARED AND ISSUED IN THE INTERESTS OF PUBLIC SAFETY BY THE B.C. ELECTRIC CO. LTD

After spring floods had inundated the homes and stores of so many of its Fraser River Valley customers, B. C. Electric issued this practical broadside telling how to recondition wiring, appliances, motors, equipment, a real help

In school lighting the company, having recently installed an IES specification school lighting job in the North Vancouver High School, are drawing this particular installation to the attention of other school boards in the territory. Immediate result of this program has been that the Richmond School Board has decided to install a test room in one of its schools.

In the field of residential lighting the company has no specific campaigns planned, but continues to advertise its home lighting service.

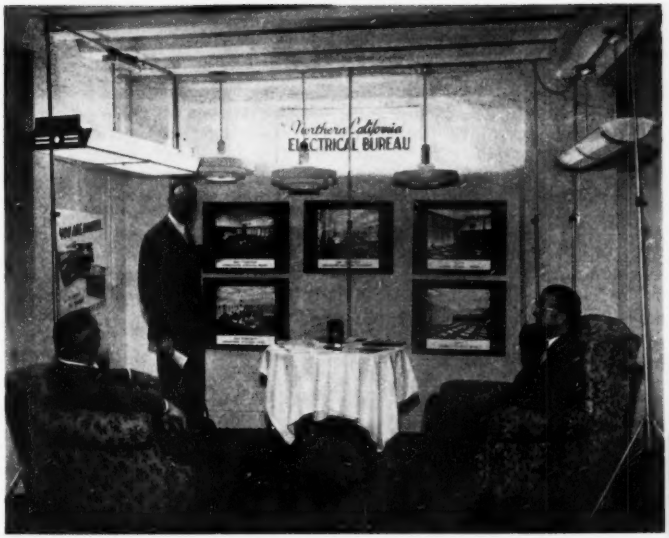
For the last year the utility has been aggressively promoting good street lighting among various municipalities with the result that many municipalities have ordered additional street lights. For this promotion the company has a brochure on planned lighting for distribution to municipal councilors, boards of trade, etc.

British Columbia Electric Railway at Victoria is also distributing commercial store lighting pamphlets to prospects in its territory. Personal contacts will be emphasized and lighting recommendations made. The company is considering a sales drive on modern street lighting directed to the municipalities in Victoria. It also has under consideration a flat rate charge per lamp per year which would assist the municipalities in their financing.

The Victoria School Board is carrying out an extensive program of building expansion and utility sales representatives cooperate with the architects

Colorado Central Power Co. modernized street lighting in many of its cities as part of a complete program. At left, Englewood, where steel pipe extensions were welded to existing combined trolley and light standards to mount OV-20 mercury units 33 ft. from ground, tilted 10° above horizontal toward street center on a 6-ft. upsweep extension arm. At right, Rawlins Electric Co. recently gave this city in Wyoming "white way" lighting by installing G-E mercury slip-fitter luminaires on Union Metal standards with 6-ft. brackets, 25 ft. above ground, four per block

Northern California Electrical Bureau did much to improve school lighting during the year, with model classrooms installed in several communities, and by showing this exhibit at school officials conferences whenever they were held



and supply them with modern lighting information.

California Electric Power Co. will have a lighting representative assist present and prospective customers in all phases of illumination.

California Oregon Power Co. reports that it will promote better lighting.

California-Pacific Utilities Co. will train contractors on selling better commercial lighting installations.

Central Arizona Light & Power Co. makes educational sales calls on customers.

Cheyenne Light, Fuel & Power Co. has a program of lighting activities and engineering service.

Coast Counties Gas & Electric Co. follows the EEI planned lighting program, and has a lighting layout service.

Colorado Central Power Co. promotes school and commercial lighting.

Fort Collins Light & Power Department uses advertising to promote better lighting.

Frontier Power Co. gives help on lighting problems when requested.

Hawaiian Electric Co., headed by its commercial vice-president, has a staff of lighting engineers who work with architects, contractors and customers making plans and layouts. One man devotes his entire time to street and highway lighting. In addition to this, the company is initiating a new residential lighting advisory service under the supervision of its home service director. This will be operated with staff members making home calls to advise on lighting problems.

Home Gas & Electric Co. cooperates with the local school board on lighting.

Idaho Power Co. has special lighting promotion programs and tie-ins with manufacturers and distributors.

Los Angeles Department of Water & Power plans no intensive promotion in the residential lighting field. It will conduct an extensive promotion in commercial lighting, supplemented with special campaigns for certain types of business establishments. In the industrial field good lighting will be promoted to increase production and improve working conditions for employees. The new construction programs of the Board of Education offer a splendid opportunity for good classroom lighting, the department reports, and an experienced lighting engineer is assigned to handle schools.

Modesto Irrigation District makes lighting recommendations on request.

Montana Power Co. gives advisory service on lighting.

Pacific Gas and Electric Co. reports that the general outlook for commercial-industrial lighting in 1949 is excellent. "New construction and industrial expansion, plus the installation and relighting of older stores, shops and offices offer an unusual opportunity for lighting promotion," says O. R. Doerr, general sales manager. The company's commercial-industrial lighting consultants will continue to advise customers on lighting sources, equipment and needs.

In school lighting the utility declares that the tremendous increases in the number of children of school age is responsible for a vast program of new school construction. To influence the lighting in these newer buildings, and to serve as an example for relighting older structures, the company has assisted the Northern California Electrical Bureau in modernizing seven class rooms. Other model "health rooms" are budgeted for 1949.

Better lighting in the home will be promoted by means of an educational program directed towards schools, P.T.A.'s, women's clubs, etc. The company will also train dealers and their sales people to sell efficient lighting equipment.

Pacific Power & Light Co. is planning no lighting promotions except to prepare layouts.

City of Palo Alto plans to develop a lighting promotion program when manpower is available.

Pasadena Municipal Light & Power Department gives lighting advice on request.

Provo Department of Utilities has no definite plans except for street lighting which it plans to extend progressively throughout the city.

Public Service Co. of Colorado reports that residential lighting is promoted through its Electric Institute, a representative of its dealers' and builders' department, and a crew of 25 domestic lighting men. In the institute, daily lectures relative to proper lighting in the home for seeing tasks and decorative effects are given to members of various women's groups. The dealers' and builders' department has a representative who calls on various electrical stores in Denver and lectures to employees about the importance of proper lighting in the home, and recommending and urging their promotion of Certified Lamps. The company's domestic lighting crew call from door to door on the residential customers informing and demonstrating light conditioning in their homes.

In the commercial and industrial and school lighting field, the utility maintains a commercial lighting department composed of eight lighting engineers who draw lighting layouts for customers and wiremen and who advocate and promote better lighting. Education meetings are conducted for the benefit of wiremen, fixture dealers, and others interested in the advantages of better lighting in commercial and industrial establishments.

For a number of years this department has been working with the public school authorities on a program of improved lighting in the schools. "Many of the Denver schools have now been completely relighted and this program

is to be continued until all the schools have been equipped with modern and efficient lighting. Assistance has also been given to a number of towns outside of Denver and several of them also have completely relighted their school buildings, with a number of others in prospect," the utility reports.

In addition the company has a specialist on street lighting who works with city officials in Denver and other surrounding towns on programs of improved street lighting. As a consequence many new mercury vapor street lights have been installed in towns which the utility serves.

Public Service Co. of New Mexico at Las Vegas gives assistance to local contractors in the lighting field.

Puget Sound Power & Light Co. gives limited planned lighting support.

Riverside Public Utilities offers the services of a trained lighting engineer for all types of lighting problems. In the residential field it will continue to offer the services of a speaker to P.T.A. and club groups. As such meetings it uses a suitable picture or demonstration showing how to have and why it is necessary to have proper lighting in the home as well as the office or place of business.

Sacramento Municipal Utility District uses direct mail and personal follow-up for better existing installations and advisory service on new installations.

Salt River Valley Water Users Assn. will provide for natural increase in the lighting field.

San Diego Gas & Electric Co. will continue direct planning and layout of lighting jobs.

Seattle City Light reports that it will continue customer advisory assistance.

Sierra Pacific Power Co. will cooperate with electrical dealers and architects.

Southern California Edison Co. plans no aggressive campaign, but will maintain its sales staff at full strength and keep up established contacts. The company says it will take any load that comes its way, will make school surveys when requested, and will continue to cooperate with architects and engineers.

Southern Colorado Power Co. will do work in the commercial, industrial and school lighting field, but reports that it is not staffed to promote residential lighting.

Telluride Power Co. will use direct mail and personal contact.

Utah Power & Light Co. says it will tie in with the national program on all types of planned lighting activities.

Western Public Service Co. will carry on promotion by lighting salesmen.

Industrial Development

New industries and expanded business not only increase kilowatt-hour usage, but increase population which in turn creates more users of electricity and subsequently makes a market for more appliances and services. Some utilities aid in industrial development by working closely with local chambers of commerce, and providing information about the area to encourage new industries. Others conduct advertising and direct-mail campaigns. The industrial development programs of the utilities are as follows:

Alameda Bureau of Electricity has lost the shipyard loads in that area, and reports that it is helping finance Chamber of Commerce efforts in getting new industries.

Anaheim Department of Light, Power & Water declares that its power load has become more diversified as to the type of new business served. The trend, says the department, is from loads allied with the citrus industry to manufacturers and small businesses.

British Columbia Electric Railway at Vancouver placed industrial development advertisements in selected media recently, designed to awaken an interest by industrialists in the potential industrial opportunities in B. C.

The company is making studies to determine which specific industries would be economically justified in being established in the territory, and thus far has selected the following group: (1) basic chemical industries; (2) the electric smelting of local iron ore; (3) a glass container industry; (4) operations to make wood chips for the pulp industry.

The utility is continuing to offer Research Advisory Service to assist local industries in their technical problems. It is taking measures to advise industrialists in general of the availability of adequate electric power facilities in its lower mainland area.

On the subject of power load, J. H. Taylor, customer services manager, says: "During the last year or so our power load has continued to grow. One encouraging feature has been the addition of large units in the woodworking industry. This industry is paying a great deal of attention to the utilization of waste products and we have had such additions as a pressed log plant, hardboard plant and pulp plant. Another important development has been the establishment of a steel rolling mill supported by a 4,000-kva. steel furnace for the manufacture of scrap into ingots.

"We continue to receive inquiries for other forms of heavy industry and, with an adequate supply of power at reasonable rates, we hope within the next few years to diversify the industry in this area to a considerable extent."

British Columbia Electric Railway at Victoria started direct-mailing advertising under the Research Advisory Service at the beginning of this year. The Northwest Research Advisory Service compiled a booklet for the Research Advisory Service which will be mailed to old and new customers. Reports A. W. J. Smith, customer services manager, "In the last six months the service has been used steadily. There have been many repeat customers . . ."

California Electric Power Co. will aid in industrial development by con-

Crowding every foot of the big armory the Electrical Maintenance Engineers of Southern California industrial show in Los Angeles played to interested engineers, contractors, electricians. This year, Mar. 24-26, it will be in a larger Shrine Auditorium, with even more exhibits and a bigger attendance

tacts and assistance of its engineers in the field.

California Oregon Power Co. will aid in the development of new industries to increase employment. Its power load continues along the same trend of business, that of lumber and lumber products.

California-Pacific Utilities Co. will assist industrial customers in planning proper electrical equipment.

Central Arizona Light & Power Co. has plans under way for industrial development, including calls and literature. Summer air conditioning continues to present a large peak load.

Cheyenne Light, Fuel & Power Co. works with the Chamber of Commerce. It reports an increase in load due to the addition of three small power users.

Fort Collins Light & Power Department stresses cheap rates in promoting its industrial development program. There has been an increased load in the territory through more use of power and extended industrial area. The company anticipates changes along this line from other new industries.

Hawaiian Electric Co. aids plantations, navy and other customers in pumping projects.

Idaho Power Co.'s industrial development program for this year is a continuation of programs carried on in previous years. The basis of the program is the gathering of facts relative to the resources of each locality. These resources include the products of the farms, forests and mines.

Reports Orland C. Mayer, director of industrial development. "Production figures are gathered for preceding years to indicate the trend of the resources. This information is tabulated and accompanied by a description of existing industries and the possibilities for new industries. A brochure is then prepared which is largely pictorial and depicts the resources and industries of the community. Such brochures are carefully distributed to select industries and inquiries for detailed information are invited. These inquiries are answered from the previously conducted detail surveys."

The company's power load has increased by 20,000 kw. to supply a phosphate plant.

Los Angeles Department of Water & Power assists existing industries in subcontracting, exchange of machine tool time and recommending the use of electricity in various processes for improvement of the product and to increase production.

The department further aids industrial development by personal contact and presentation of factual information about the area, as to market, sources of raw materials, labor supply, availability of water and power, and other contributing factors to encourage new industries to locate there.

A monthly newsletter "The Production Expediter" is mailed to approximately 5,000 industries.

Says Charles C. Snyder, business agent, "Subcontracting by automobile assembly plant has permitted other plants in the area to continue production after war contracts were terminated."

Montana Power Co. offers advisory service for industrial development.

Pacific Gas and Electric Co., in cooperation with all other groups and organizations which are working towards California's development, is actively carrying on an industrial development program embodying the services of site surveys, market analysis, production cost analysis, raw material studies, prospect referral, community industrial planning, and general area stimulation.

Increased agricultural expansion with consequent irrigation requirements has caused a heavy seasonal pumping peak during the summer months, the utility reports.

Pacific Power & Light Co. helps industries find sites and provides general assistance in industrial development.

Portland General Electric Co. reports that a larger diversity of industrial customers has caused a significant change in the character of industrial power business, and that additional diversification will bring about more changes along this line from other new industries.

Provo Department of Utilities cooperates with the Chamber of Commerce in industrial development.

Public Service Co. of Colorado has a program of cooperation with chambers of commerce of various cities throughout the state and with the Colorado Resources Development Council Inc., in making surveys that will be helpful to those contemplating the establishment of factories or moving branches to that area. They have prepared a great deal of information as to the availability of raw materials, facilities, water, power supply, and other factors vital to the industry. Through the combined efforts of these groups, many new industries have developed in the area.

A continuation of the trend of heavy increase in all industry except metal mining has brought about significant changes in the character of industrial power business. Possibilities in oil shale processing would bring about more changes along this line.

Public Service Co. of New Mexico at Deming is working with the Chamber of Commerce in direct-mail campaigns to bring factories to that area.

Puget Sound Power & Light Co. is carrying on no industrial development program this year. Power load has made no significant changes other than a reduction in system peak due to load molding.

Riverside Public Utilities works continually with its local Chamber of Commerce, giving all help possible in the development of any new industrial projects.

Sacramento Municipal Utility District conducts a direct-mail campaign on industrial heating, power factor correction, and special power applications. It cooperates with the Chamber of Commerce on new industries.

Salt River Valley Water Users Assn. says it is providing for natural increases in aiding industrial development.

Seattle City Light reports that 15,000 kw. of industrial load has already been contracted or committed for in 1949. Its major program will be load molding to control the winter peak without curtailing production.

In reporting on power load making significant changes in character of business, P. C. Spowart, electric sales manager, says the trend is to fill valleys in load curve on swing and graveyard shifts. Kilowatt-hour consumption has increased about 10% with a small increase in plant peak since February 1948, he reports.

Southern California Edison Co. plans no promotion of industrial development, but will take all that comes to its lines and meet competition. Its power load is growing with more heavy industry and extensive plans for arc furnaces. Existing steel plants are considering arc furnaces, which would bring more changes along this line.

Southern Colorado Power Co. is working closely with the Chamber of Commerce industrial committee. The company reports that the per cent of industrial kilowatt-hour consumption is up. New industries are growing continuously. There seems to be a good possibility of location and relocation of many small and medium industries from congested coastal areas. A large manufacturer of aluminum is now in the process of moving its whole plant and offices from Chicago.

Utah Power & Light Co. declares that, while no definite activity has been set up in the company under this name, it does considerable work along these lines. The utility anticipates changes in character of industrial power business because of the development of adjacent oil fields, as well as phosphate and other new industries. Industry is generally expanding very rapidly in the territory.

ELECTRICAL WEST

Annual Stocktaking

ONCE a year this publication helps the electrical industry in the Far West take stock of itself. The record for 1948 set forth in this issue is one that warrants pride on the part of the industry and merits commendation from the public. Electric power systems, even though harrassed by drought, floods and blizzards, performed heroically, turning out record totals of electric energy. More new customers than ever before received service. With the help of manufacturers and contractors, the power companies added more new generating capacity than in any previous twelve-month period. More new homes were wired, more new factories electrified, more commercial establishments equipped electrically than in any other year. And the public purchased more appliances. All in all, it was a commendable achievement.

In certain respects 1949 promises to duplicate 1948. Reports printed on other pages of this issue tell of the huge construction programs that by 1952 will give the region almost double the generating capacity it had in 1940. They tell of renewed interest in selling and merchandising, occasioned by full pipelines of consumer goods. They tell of the still expanding Western industrial economy and of the continued need for housing. They point out the growing power requirements of agriculture. No seer is needed to predict another great electrical year in the Far West.

There is one fact we can't overlook. All of this is being accomplished by free enterprise, spurred on by the incentive of competition, free from domination by the state.

Why a CVA?

LEGISLATION to create a Columbia Valley Authority patterned after TVA is being prepared for presentation to Congress. Whether the people of Oregon, Washington and Idaho want it or not, apparently the all-powerful, patronizing "do-gooders" are going to give them the "benefits" of regimentation under federal bureaucratic authority.

Aside from the Grange, the Farmers' Union, a few misguided labor leaders and a vociferous group of bureaucrats, there is little local agitation for a CVA. The governors of the three states are opposed. Major business interests view it with considerable alarm. The utilities, business-managed and municipal alike, have no interest in the suggestion. And assertions that a CVA will bring relief for the Northwest's power situation and will prevent floods on the Columbia are almost pure nonsense.

However, and here is the rub, an area where hardy pioneers through hard work and initiative have developed a great agricultural and industrial empire will soon be told what it can and cannot do in developing its resources. Presumably these people now don't know what is good for them. Only the omniscient few in Washington can tell them.

Shortages to Sell

IF one thing should have been learned from the public reaction to the shortage of power that afflicted the California electric utilities last year and that has the Northwest utilities in its grip this year, it is that the engineers should not try to sell the conservation idea to the public. It takes the most emotional of sales appeals, made by the very best advertising and sales experts in the field to sell the public patience with a situation that hurts them so intimately. Even the most appealing treatment will not satisfy a great many customers and will provide the demagogue with fire to fan into big discontents.

Oddly though, the minute such a crisis appears, the engineers rush in where angels of public relations would know better than to tread. One company that has been outstanding in its human interest approach in advertising and has won by it an exceptional public response, was caught short of gas to supply the tremendous added demand that an unprecedented winter freeze put upon it. Its engineers insisted on long detailed factual explanations to the public. But these only aroused argument over details. Being men of decision, engineers are prone to express their "requests" as demands, and that just rubs a shivering public where the chillblains are raw and painful. A human appeal for help and understanding, done in the pre-crisis emotional and popular

EDITORIAL VIEWS

style, without argumentative facts and figures, would have been more soothing to cold and mad customers.

The lesson that shortages should have taught last year is this: When it comes to engineering and construction, advertising men shouldn't try to butt in—and vice versa.

As Others See Us

WHY is it so hard for every person to put himself into the other man's place and to look at himself from that point of view? To do so is the very fundamental of selling, of public relations, of getting along with people. Why is it done so seldom? Certainly the idea is well publicized. Every training course urges it. Many speakers advocate it. It is preached from the pulpit and advised by the press. Yet almost no one does it.

Does each man's ego, his instinct of self preservation perhaps, cause him to reject such a thought, not permit it to enter his mind? Once admitted to the mind no idea could be more logical. Nor is there anything that gives the ego greater power to cope with any situation.

With an outlook in the year ahead for many difficult and aggravating conflicts of interest between competitors and between branches of the industry, there will be need as never before for understanding each others' point of view and needs. The tensions can break out into the worst dog fight the industry ever had if each one bows his neck and insists on his own "rights" and wants. By taking into account the other fellow's problems and point of view, however, most of these struggles can be adjusted or compromised and settled.

The agents of chaos will do their utmost to stir up battles among us to weaken and destroy the freedom system of human operations. They can best be frustrated in this destructive campaign by each one who believes in free enterprise making an effort to understand and get along with his fellow enterprisers and competitors. Talking at the Communists will not halt their insidious attack. Appreciating and working with our fellow believers in the democratic way of life is our best defense.

HERE is a business man's credo derived from a faith that has come out of a lifetime spent in business during a period of momentous changes . . . I believe in freedom for the individual and freedom for enterprise, as the best environment for human happiness and progress . . . I believe that rising standards of living for increasing numbers of people can be achieved most effectively through the encouragement of business enterprise and private investment of capital . . . I believe that profit is indispensable as incentive to enterprise and as a source of savings for the development of enterprise . . . I believe that competition, operating through free markets, is the most powerful stimulant to economic progress and that the benefits of competitive enterprise go chiefly to consumers and society . . . I believe that business enterprise has responsibilities toward consumers or the public, employees, investors and government and has responsibility for balancing these obligations equitably . . . I believe that the foundations of business are fair dealings, honesty, exchange for mutual advantage and mutual understanding among employers and employees, sellers and buyers, business and government . . . I believe that business enterprise has the duty to inform the public frankly and thoroughly about the activities and needs of business . . . I believe that business exists to satisfy human wants, that the most valuable business assets are human assets and that the real test of business enterprise is what it contributes to human welfare and progress . . . I believe that businessmen have an obligation to the community, must take an active personal interest in public affairs and should be leaders in social as well as economic progress . . . I believe that American enterprise is the strongest bulwark of western freedom and now has the historic task of helping to safeguard this freedom against the encroachments of the despotic state.—Earl O. Shreve, president, Chamber of Commerce of the U. S.

T. E. Roach, president, Idaho Power Co., tells plans to provide plenty of power. Hopper and Baldridge are at table

Idaho Contractors Propose Law Changes

BECAUSE its state legislature is in session, the Idaho State Electrical Contractors Assn. called its second annual convention early, Jan. 17-18, at Nampa, and considered a proposed redraft of the 1947 act which established licensing of electrical contractors and journeymen and prescribed the National Electrical Code. Some 60 contractors, out of a total registration of about 80, came from every section of the wide open spaces of Idaho to discuss the proposed amendments, give them their support and to hear messages from other branches of the industry.

William A. Hopper, Gem State Electric Co., Boise, its president, ran the show like a veteran ring master, even to the point of making sure he would not be re-elected president at the close of the compact two-day conference. A. R. Wooley, Mountain Electric Co., Pocatello, was elected to succeed Hopper.

A vigorous theme of private enterprise and independence ran through the entire program. Tom Roach, president of Idaho Power Co., and Stanley Johns, manager, Westinghouse Electric Corp., Salt Lake City, particularly sounded that keynote. Recognition of interdependence with others in the industry was brought by other speakers: Maynard Smith, Graybar Electric Co., Boise; Adam W. Moudy, president of the IBEW local in Boise; W. A. Cyr, associate editor, ELECTRICAL WEST; K. Lemley, manager, Kootenai REA; A. E. Fleming, General Electric Supply Corp., Salt Lake City, and R. J. Larrabee, field engineer, Underwriters' Laboratories Inc., Seattle.

But it was the Idaho state law that was the chief concern of the meeting. J. Carl Baldridge, state electrical inspector, explained the reasons for the amendment, drafted by a committee of contractors, inspectors, union representatives, power company and wholesaler representatives and about to be submitted to the legislature. The original law had been deficient in giving legal right to the administrative board to appoint inspectors and conduct inspections. Other portions of the law require clarification and more accurate definition. The board, it is proposed, will be more balanced. It will have on it appointees by the governor representing contractors—four in all, one from each of the four divisions of the state; journeymen—four in all, with similar distribution; a representative of a privately owned electric utility; a representative of a publicly owned utility or cooperative, and a representative of the electrical distributors. Candidates for members of the board would be submitted to the governor by industry associations or unions respectively. The new draft would also require contractors to have a performance bond of $1,000.

That Idaho is beginning an industrial growth which will provide contractors with business opportunity, was the thought Tom Roach, Idaho Power president, gave the group. With a quick review of agricultural, mining and processing industry now unfolding, Roach promised that private enterprise would build generating plants sufficient to their needs. There is no justification for government to claim that it should develop the power, he said. "We will have the capacity, so you gentlemen will never be restricted in your opportunities." He talked frankly, businessman to businessman, of the utility financing and tax problems. He urged that the development job be done at the grass roots instead of the expensive way, via Washington, D. C.

Stanley Johns gave one of the clearest analyses of the wage-price and purchasing power situation in the nation today, heard in recent time. "How Best Can Workers' Purchasing Power be Increased," was his title (and ELECTRICAL WEST hopes to publish it soon). He proved that the only way wages can be increased in rate is by increase of productivity per man. Likewise he suggested that the use of electricity, better tools and removal of artificial restrictions to productivity, and not the "speed up" would do the job. In fact, Johns pointed out, in the past 40 years the record shows it has been this increased rate of productivity that has increased wages and buying power, with or without war, with or without labor unions.

That the distributor is necessary to the economy of sales was the idea presented by Maynard Smith. Despite the clamor to do so, he cannot be eliminated because the manufacturer cannot send his products direct to every contractor, nor can the contractor carry the variety of stock required. It

is too expensive for the contractor to be his own distributor. On the other hand, the wholesaler cannot afford to carry all the stock required of him unless he has the contractors' business. He advocated patronizing the jobber who works with the contractors.

Adam Moudy told of the indispensible need for cooperation between contractor and his employees.

"It is our opinion that, for the employee to hold a mental picture of his employer as 'old money bags,' from whom he should only try to obtain as much money as possible for as little work as possible; or for an employer to hold a mental picture of an employee as a slave from whom he should sweat as much work as possible for as little as he can, is a condition best to forget."

The relation of the two should be considered a partnership, he said. "Together we can build up institutions and practices that are progressive and sound in the public interest." More knowledge and skill is needed both by electricians and shop owners. "Incompetence ruins your business and mine." Union and employer apprentice training is an important factor in this education.

A step-by-step, simple method by which contractors can benefit from the Planned Lighting program was explained by A. E. Fleming. The key man in the program, Fleming contended, is the electrical contractor. He then outlined the steps by which to sell a plan, and from the plan to sell adequate lighting jobs. He advised no compromise with adequacy because the compromise would satisfy no one, and bring criticism rather than more jobs. The contractor gains also from the large unit sale a planned lighting job will bring. It would also tend to eliminate the highly competitive type of bidding.

The point of view of others in the industry in measuring the contractor was presented by Cyr in a talk "What Do I Get Out of It? or How to Tell Your Friends From The Apes." Tighter business and more competition, with breakdowns in the trade practices, may bring from contractors a demand that "something be done about it." Then the question, "what do I get out of it?" is applied to the association. Cyr then showed what the manufacturer, distributor, union, etc., require for their own self preservation and said they applied the same test, "what do I get out of it?" to the contractor. The legal and only way to correct these evils, Cyr maintained, was to become the best channel that a manufacturer, wholesaler, union or others can use to get done what they need in the way of distribution or work for their men.

That an REA is the most private of all private ownership was the statement of Kenneth Lemley, because each REA is owned by the actual customers it serves. He explained the underwriting and financing of REAs and the taxes they pay. An interesting survey of 980 customer members of the Kootenai REA, in which they were asked for a list of appliance and equipment they expect to buy in the next year, said Lemley, indicated a market of nearly $600,000 in appliances and farm electric equipment, not including sprinkler irrigation. Of the 980, Lemley said, 26% said they wished the REA itself to sell appliances, 18% asked it to do appliance service. Lemley interpreted this as a feeling that electrical contractors and dealers have failed to do the sales and service job they should. The REA had no desire to enter these businesses, but wished contractors and dealers to live up to their opportunities.

Keen interest was evidenced by the contractors in the way Underwriters' Laboratories test materials and appliances. This was described by Ray Larrabee. He also laid the background of the National Electrical Code and of Underwriters' Laboratories and its relationship to the insurance underwriters. Larrabee explained how standards are established and the way to find listings in the approved list.

Ad R. Wooley, Mountain Electric Co., Pocatello, takes over presidency of the Idaho association from Bill Hopper

Ron Shumate, Shumate-Gibson Electric Co., Nampa, was convention chairman

Subjects discussed at a free questioning closed session included discount differentials on materials, wholesaler's sales of fixtures direct to customers, bid peddling by general contractors.

Elected at the closing business session were the following: for president, A. R. Wooley, Pocatello; vice-president, Joe Brunzell, Moscow; Northern Division vice-president, Ed Jones, Grangeville; director, Spence Lewis, Moscow; Southwestern Division vice-president, Joe Gilgen, Caldwell; director, Ralph Hall, Glenns Ferry; South Central Division vice-president, Merritt Shotwell, Twin Falls; director, A. O. Barker, Oakley; Southeastern Division vice-president, Bob Bauchman, Idaho Falls; director, R. J. Langford, Montpelier; secretary, J. Carl Baldridge; treasurer, E. Hall, Pocatello.

Wooley indicated that next year's convention probably would be held in Pocatello. He also interpreted the fact that Idaho Power Co. proposes to double its generating capacity in the next few years as a big responsibility for contractors to sell and install the equipment which will employ this new capacity. The convention, by resolution, approved the proposed amendments to the state code and advocated their passage.

Les Johnson, General Electric Co., Salt Lake City, was asked to summarize the meeting at its close, doing so in a crisp, effective manner. Arrangements for the convention at Nampa were handled by Ron Shumate, chairman, with a committee consisting of Jack Drinkall, Bob Hopper, Lou Baugher and Bob Mangun.

EMEA

The threesome of W. M. Hogue, C. W. Doane, and George Larsen all contributed on the subject of the repair shop's function in keeping a plant in operation, at the January meeting of the EMEA of Southern California. The program, presented by Larsen-Hogue Electric Co., was followed by a question and answer forum . . . Plans are getting under way for the association's third annual Industrial Electrical Show to be staged at the Shrine Convention Hall, March 24-26.

New Mexico Chapter IAEI Big Inaugural

What started as the first annual meeting of the New Mexico Chapter, International Association of Electrical Inspectors, turned out to be an industry convention of contractors, journeymen, inspectors, wholesalers, utilities and manufacturers, a total of over 130, for a two-day session and manufacturers' exhibit at Hotel Hilton, Albuquerque, Jan. 7-8.

After a brief business meeting in which the active inspectors, a dozen or so, mostly from the New Mexico Electrical Administrative board in various cities of the state, elected E. S. Butt as chairman, Elmer Kaemper, vice-chairman and R. L. Thompson, engineer for the board, secretary-treasurer, the convention proper began with a banquet, over which Victor Moulton, secretary of the Rocky Mountain Chapter, Denver, was made master of ceremonies.

Charles Smith, IAEI secretary-treasurer, Chicago, outlined the IAEI organization and history and explained the benefits of membership to eligible associate members. After a short recess, Charles Willard, General Electric Lamp Division, Denver, demonstrated lamps and light sources and told of their characteristics and uses. A talk on call systems by Art Bacon was omitted when he was called home by illness.

Switchgear and industrial controls and unit substations were presented in talks and by slide films by F. F. Stevens and J. A. Setter, General Electric Co., to open the Saturday session. Rex Gray, Trumbull, then discussed plug-in busways. Ted Fisher, Westinghouse, spoke on lighting fixtures and lighting design, followed by J. L. R. Cougar, who showed movies of Westinghouse Quick-Lag load centers.

The afternoon session contained: a talk and demonstration of capacitors by J. K. Howell, who also demonstrated CSP transformers; E. T. Cotton, Triangle Wire & Cable Co., who told of construction of conduits, wires, insulations and cables; Paul Hefflefinger, Chase Shawmut Co., who showed slides illustrating the history of fuses and fuse links in action. Moulton concluded the meeting with compliments for the meeting attendance and recommendations for next year's meeting, Jan. 12-14, 1950. A dance ended the festivities.

Exhibitors included: J. C. Coulson, General Switchgear Corp.; H. George Shefler, Moe-Bridges, General Lighting, Rawlins Inter-Communication Systems; Kenneth B. Schumann, Midwest Electric, Swivelier, Rodale; Daniel Woodhead, Raco, I. S. Slater devices; Paul Douden, Thomas & Betts Co.; R. T. Lewis, Pass & Seymour; Joseph R. Roy, C. D. Belt Co.; J. R. Cougar and R. R. Hynes, Westinghouse. The Thomas & Betts display was donated to the apprenticeship school. Four Albuquerque wholesalers, Fred Newberger, General Electric Supply Corp.; Ray Bygel, Electric Supply Co.; Bill Lawrence, State Electric Co., and Charles DeWitt, J. Korber & Co., underwrote the convention financially and also furnished entertainment and refreshments.

IES Conferences

Awareness of what is new in the science and art of illuminating engineering is to be brought to lighting people of the West in the two Pacific regional conferences of the Illuminating Engineering Society in March. While the plans of the North Pacific region for a conference possibly in Portland have not yet been announced, the South Pacific conference is shaping up for a fine and comprehensive program, March 3-4, at Pacific Gas and Electric Co. auditorium, 245 Market St., San Francisco.

IES President Lee E. Taylor, senior lighting engineer, Detroit Edison Co., will open the Thursday morning session with an address. Remainder of the session will be devoted to light sources, with Sam Hazelton, chairman, Northern California Section, presiding and Charles R. Long, Lamp Division, Westinghouse, Los Angeles, speaking on "Recent Incandescent Lamp Developments." New developments in fluorescent lamps will be told by J. W. Howard, General Electric Lamp Department, Los Angeles.

That afternoon Don K. Grandey, Southern California Edison Co., Southern California Section past chairman, will preside over a session on store lighting. Principal address will be by Don P. Caverly, director of commercial engineering, Sylvania Electric Products Corp., New York, whose subject is, "Pros and Cons of Store Lighting Sources, Systems and Color," illustrated with color slides of installations by leading Eastern designers.

Friday morning session, presided over by the chairman of the Southern California Section, Leonard W. Towner, General Electric Co., Los Angeles, will be a technical session dealing with color, brightness ratios, etc.

For the school lighting symposium, Friday afternoon, presided over by H. H. Robison, PG and E. Oakland, past chairman, Northern California Section, will have as its feature attraction Dr. Darell Boyd Harmon, of University of Texas, Austin, Texas, and nationally known for his studies on environment for the school child, including lighting. On the same program will be Doyt Early, architect for California state division of school house planning, who will report on a lighting evaluation study made in 25 recently built California schools. Dr. Leland Brown, Stanford University, will review the school lighting standards of IES, approved in 1948 by the American Standards Assn.

Ted H. Shepherd, director of Lighting, Los Angeles Department of Water & Power, South Pacific Regional vice-president, will conclude the meeting with an outline of plans for the 1950 national convention of IES in Los Angeles. Meetings will be open to anyone interested in illumination.

Contractors

Classes on estimating, conducted by E. R. Cornish, field representative, National Electrical Contractors Assn., have started again in San Francisco. Size of the group required moving to Mission High School, where meetings are held on Wednesday evenings in room 422. Classes are sponsored by the San Francisco Electrical Contractors Assn.

The Western, or District 6, office of NECA has been located at Western Merchandise Mart, San Francisco, 982-A, which is now Cornish's headquarters. The San Francisco association quarters are on the fifth floor.

Sacramento Valley Chapter, NECA, held its annual dinner at the Sutter Club, Jan. 11, honoring its newly elected and retiring officers. The new officers of the chapter are: Fred A. Carlson, president; Frank Merwin, governor; James Mapes, vice-president; James Newmarch, secretary; Louis Stein, treasurer, and Ed Wismer and J. D. O'Connor, directors.

Fresno branch of Northern California Chapter, NECA, held a meeting Jan. 20 to consider establishment of its own chapter. Preliminary steps toward such a chapter were taken.

J. Scott Milne, international secretary, International Brotherhood of Electrical Workers, was scheduled to address a joint gathering of electrical contractors and IBEW members at the Moose City Club, Oakland, Jan. 27. The meeting was sponsored jointly by the Northern California Chapter, NECA, and the IBEW. Milne's talk, "What About Tomorrow," was to include comments on economic and labor conditions in England and Germany, based on observations made on a re-

cent trip to Europe. It will be reported next month in detail.

N. S. Beyer, district manager and field engineer, Bussman Mfg. Co., presented a slide-film illustrated talk on "Over-all Protection for Electrical Equipment" at several branch meetings of the Northern California Chapter, NECA, among them the Alameda and Contra Costa branches. Thomas J. Mellon, Wesix Electric Heater Co., addressed the Santa Cruz-Watsonville branches, Jan. 3, co-sponsored by Coast Counties Gas & Electric Co.

Officers elected by the various branches of Northern California Chapter, NECA, for 1949, include: Salinas Branch — Louis Schallich, chairman; J. H. Mertz, vice-chairman; Randolph Smith, secretary. Fresno Branch—William E. Ochinero, chairman; Bert Demmon, vice-chairman; Frank Caglia, secretary-treasurer. Tulare-Kings County Section—Otto Luhdorff, chairman; John Suderman, vice-chairman; William Pickerel, secretary. Santa Cruz Branch—Cecil Searle, chairman; Lovell Johnson, vice-chairman and Bruce Hogue, secretary. Alameda County Branch—B. A. Solomon, chairman; M. E. Rose, vice-chairman.

IEEDA

R. W. Burch of Coeur d'Alene was elected president of the Inland Empire Electrical Dealers Assn. for this year at a meeting of the association's board of governors recently. He succeeds John F. Boothe. Claude Edgren, Colfax, will serve as vice-president, and W. J. Maghan, Spokane, as treasurer. F. A. Tool was re-elected secretary, and Robert L. Wilkinson reappointed executive secretary.

Motor Shops

While many belong to the National Industrial Service Assn., the organization of electric motor and industrial contracting shops, that organization does not handle labor negotiations. Therefore a group of San Francisco electric motor houses having to deal with the same union have formed a separate organization known as Associated Electric Motor Repair Shops of San Francisco Inc. Officers of the group are: William Cathcart, Marine Electric Co., president; James Powers, West Coast Electric, vice-president; Matthew Buzzell, Buzzell Electric Works, treasurer, and Clarence Lindstrom, Weidenthal-Gosliner Electric Works, secretary.

Electric Clubs

Awards for a recent public school motor winding contest, sponsored by the San Diego Electric Club, were presented at the club's Dec. 20 meeting. First place winner was Bailey R. Esquerra, San Diego High School. Other winners included Paul Blackwell, San Diego High School, second; John Short, La Jolla High School, third; Ernest Little, San Diego High School, fourth; Richard Hamann, Hoover High School, fifth; and Neil Hillier, Hoover High School, sixth.

At Los Angeles the Electric Club held its first meeting of the new year with W. C. Mullendore, president, Southern California Edison Co., as guest speaker, discussing government policies and political trends. . . . At the following meeting G. E. Stoltz, consulting metal working engineer of Westinghouse, who has just returned from France, discussed the rehabilitation of the French steel industry.

U. S. Chamber of Commerce President E. O. "Bill" Shreve, recently returned from a European tour, presented his views on conditions in Europe to San Francisco members at the Jan. 3 luncheon meeting. . . . D. D. Smalley, vice-president, PG and E. brought the Jan. 24 meeting up to date on the company's construction program.

In cooperation with the Northern California Electrical Bureau and the State Department of Education, the Sacramento Electric Club will sponsor a free home appliance salesmanship course of four evening sessions. First class will start Feb. 23; enrollment will be limited to 30. . . . Through the cooperation of the Association of Broadcasters, radio station experts discussed radio and television at the first club meeting of the year.

IES

Airport lighting and probable trends were reviewed by Richard E. Madigan, airport lighting specialist for the Line Material Co., at the Utah Chapter meeting in January.

In honor of the late George M. Boyd, a memorial resolution was presented at a recent meeting of the Puget Sound Section. Illuminating Engineering Society. K. E. Hollingsworth, chairman of the section, presented the resolution. Mr. Boyd was former chairman of the Washington State Chapter of the society.

Northern California Section, IES, held its January dinner meeting at the San Francisco Engineer's Club, with R. "Bob" Thallon, illumination engineer, Pacific Gas and Electric Co., as principal speaker. Thallon discussed lighting developments in the past year and new features in lighting here and abroad.

Open forum session at the Jan. 5 meeting of the Southern California Section featured L. A. Rice, Electrical Products Corp., on the subject "Cathode Types, Characteristics and Uses"; A. B. Smedley, General Luminescent Corp., discussing "Standard Cold Cathode Lamps"; and J. M. Smith, Sola Electric Co., on the topic "Custom Cold Cathode Lighting."

EMEA

Modern fluorescent lighting maintenance was the subject discussed by W. C. "Bill" Abrams, Eveready Electric Co., San Francisco, at the January meeting of the Electrical Maintenance Engineers' Assn. of Northern California.

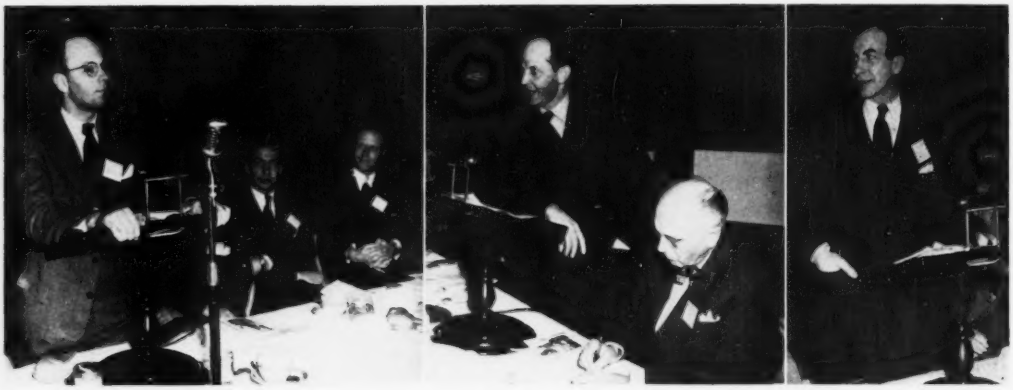
Bureaus

With the advent of television in the San Francisco area, the Northern California Electrical Bureau, whose field staff handles radio complaints, has set up a similar policy for television. Television interference complaints will not be accepted from individual users of TV receiving sets. Such complaints will be referred to the dealer from whom they purchased the set. Complaints will be accepted from dealers or broadcasters only upon their assurance that the difficulty is caused by sources outside of the customers' premises. Accepted complaints will be checked for sources of interference and referred to the proper authorities for clearing.

LeRoy H. Bennett has been retained as director of activities for the Northern California Electrical Bureau, with headquarters in the Western Merchandise Mart, San Francisco. A schedule of meetings for appliance dealers is being arranged.

Annual business meeting of the Southern California Radio & Electrical Appliance Assn. was scheduled for Feb. 3, at Nickabob restaurant, Los Angeles. Election of officers and plans for the year were to be the program, among them the second annual electrical exposition in midyear. Another event that will come soon will celebrate the 100,000th television set sold, said W. J. Quinn, manager. Sales had topped 79,650 by January.

Contractors division of the Bureau of Radio & Electrical Appliances of San Diego County have an unusual table top exposition meeting scheduled for Feb. 11, at San Diego Gas & Electric Co. service building. Manufacturers of all kinds of materials and devices, including built-in heaters, fans and similar appliances, sold and installed by electrical contractors in residences, will display on the tables. A panel discussion by contractors on adequate wiring promotion will feature the evening meeting.



Goggin Stevens Borthwick Hampton Mitchell Stevens

In Preparation for Today's Selling

WITH distinguished electrical industry executives from Chicago and Philadelphia as featured speakers, plus an imposing array of local and regional appliance men as speakers and discussion leaders, the annual winter conference of the Bureau of Radio & Electrical Appliances of San Diego County was held on Jan. 19 with a record attendance of 450 for the one-day session. Between noon and 10 p.m., in the carefully arranged and timed schedule developed by bureau secretary-manager, J. Clark Chamberlain, 18 features involving 52 speakers and participants, were heard in one of the most timely programs presented in the industry.

Following a welcome by Harold B. Starkey, president of the San Diego Chamber of Commerce, the popular vice-president of S. D. Gas & Electric Co., A. E. "Doc" Holloway, outlined the problems which the company had met and solved during the recent severe cold weather, showing that the company had reached at one time during the period the highest consumption in its history, when a peak of 254,000 kw. was supplied. He said that 30 transformers burned out the night of Jan. 4 because customers had not notified the company that they were connecting many large heaters. He reported that the rate of applications for electric service had dropped 50%, and that the company expected to be back to normal within two months, with a 30-day delay for service extensions.

Soothing syrup for the business nerves of the hundreds of appliance dealers was supplied by M. G. "Pete" Sues, Los Angeles appliance distributor and president of the PCEA, along with some advice designed to put more emphasis on selling. Although the retail appliance business had a lowered volume in November and December, he said, dealers should remember that they put a heavy emphasis on credit business prior to the re-instating of "Regulation W." The successful appliance retailers in the year ahead will be those who do more advertising and selling, who allocate a regular amount for sales training and advertising, who "use the user" in their sales efforts.

The business outlook for San Diego County as a whole was presented by Anthony Borthwick, executive vice-president of the First National Bank in that city, who reported that retail collections had become slower during the latter part of 1948, and that there had been an 11% drop in retail sales in San Diego during that year. He said that dealers' cash balances were reduced and their inventories much higher. He added that there seemed to be little doubt but that credit regulations would be continued when they came up for consideration in June.

As the featured guest speaker for this opening noon luncheon meeting, Geo. T. Stevens, president of the Chicago concern manufacturing Presteline products, continued to call the dealers and salesmens' attention to the need for down-to-earth, prewar approach to appliance selling. He also emphasized the need for selling that "used the user" and he pointed out that it was about time to bring in the old selling practices of "following the ice trucks to sell refrigerators, looking for clothes on the line to sell dryers, looking for smoke from the chimney to get electric range prospects." He added an optimistic note with the observation that, in spite of slow business in November and December, there had been no national evidence of wage cuts and steel cost cuts which would be an indication of a poor business era.

The market opportunities presented during the last year to dealers in San Francisco, Salt Lake City and Seattle by the coming of television were covered by the closing noon speaker, R. C. Goggin, Western director of TV programming for the American Broadcasting System. He reported that television programming is now in a transitional stage, with new methods of production under development, and new sources of programs under consideration. In the last year, he said, television has shown that old-time vaudeville could be a success, that serious drama was possible, and that film transcriptions served adequately to improve the programs on stations not connected to networks.

How appliance dealers can coordinate their advertising and promotion with the known peaks in appliance sales was covered at the opening of the afternoon session by "Frosty" Raymond of the utility. He showed that total appliance sales hit a peak in May, October, November and December, with refrigeration sales reaching a high point in April and May. He showed how the extensive advertising and promotion campaign of the bureau,

Dealer panel—Elmer Hazie, Gordon Dawson, C. M. Roberts and Bob Shaffer

in cooperation with San Diego Gas & Electric Co., anticipated these buying trends and scheduled its space to increase business during these periods.

Continuing its regular analysis of the home freezer business and the best methods of selling them, the bureau's conference had scheduled a "Home Freezer Discussion Panel," led by Archie Marsden of Parmelee-Dohrmann, Los Angeles, assisted by Ben Sanderson, Pacific Coast manager of Deepfreeze, T. J. McIntire of Yorkville Paper Co., and Luther Barber, locker operator from La Jolla. In discussing what the industry should do to get freezer sales rolling, Sanderson said that manufacturers and distributors should see that there is a freezer in the home of every dealer and salesman. If the dealer or salesman is not enthusiastic about the use of a freezer, after having it and freezing some of his own foods for 30 days, he should not continue handling the product.

Freezers need to have a good traffic spot on the dealer's floor, the panel agreed, with plenty of food in these freezers and both advertising and demonstrations to create interest. The dealer should not stop with the sale, either, the group emphasized, but should help the customer get full value and use from his freezer. One important, and so far neglected, way to help is to carry a full line of packaging materials, and another is to make arrangements with local locker plants and food outlets so that the freezer owner can make quantity purchases.

The viewpoint of the dealers themselves was brought into the conference through a continuation of the dealer panel started a year ago by the bureau. With Elmer Hazie as chairman, the panel consisted of Gordon Dawson, San Diego; Bob Shaffer, Oceanside, and C. M. Roberts of Imperial Beach. The topics brought up for discussion by these dealers still have the distributors and manufacturers in southern California buzzing with comment. First for consideration was the declining gross profit evidenced by most dealers during 1948, averaging a 4.7% decline. The dealers claimed that the reasons for this decline were the continued low margins at a time when the dealers' advertising and selling costs were rising to prewar levels. Dawson said that sales costs were rising because salesmen had to spend more time with each prospect to make a sale. Another mentioned that discounts should be higher on small-quantity purchases so that the dealer could keep his inventory in line and reduce overhead. The other important subject to the dealers was the increasing cost of maintaining the service guarantees established by the manufacturer. They felt that there should be some compensation to the dealer for the labor involved in making operational changes during the first year, and in making unit changes in refrigerators during that period. They believed that a 90-day labor guarantee is sufficient for all major appliances.

Following a few words of greeting from Mayor Harley E. Knox of San Diego, the evening dinner session of the conference dove again into the dealers' appliance selling picture with a talk by Kenneth L. Hampton, manager of Valley Electric Supply, Fresno. He said that there was no need to be pessimistic about the future of the appliance business if the dealer was willing to consider what it took to do a profitable business. For the dealer who realizes that the normal approach to a profitable appliance business requires attention to advertising, promotion, displays, floor selling, telephone selling, cold canvassing; who knows that the sales emphasis must be on features not on price, that many new products must be pushed to get the plus-volume that means profit, that turnover is very important when working on narrow margins, that it means to buy fast movers, sell them fast and unload dead stock, there is no question of a profitable and successful appliance selling future ahead.

Following the report of Ed Meise, who substituted for Taylor Brown, chairman of the bureau's sales training committee, in outlining the sales and educational programs of the organization, Bureau President A. K. Chamberlain introduced the evening's featured speaker, Jack M. Otter, vice-president and general sales manager of the Philco Corp., Philadelphia. He said that both manufacturers and dealers have been complacent since the war, with the suppliers more interested in the procuring of raw materials than the sale of the goods. The dealers and salesmen will best be prepared for the coming period of competition by concentrating on thorough product knowledge and technique of selling, he said. This need for product knowledge will increase because manufacturers will have to start making more year-to-year changes in models and designs to keep up the public's interest and to give the dealers a selling story.

Otter detailed the need for more concentration on one line of appliances, pointing out that there are less than half as many exclusive dealers today than before the war. With one full line, he said, dealers and salesmen will do more, know more about moving the products. They will get more cooperation from their distributors. They will have lower inventory costs and faster turnover.

The annual conference was closed with an inspirational talk by Fred B. Mitchell, vice-president of the National Association of Real Estate Boards, who talked on "Your Opportunity and Obligations in 1949." In keeping with the custom of previous conferences, Manager Clark Chamberlain called two impromptu sessions in which manufacturers' agents were given three minutes each to outline the selling and promotional lines of their suppliers, and at the evening session, factory representatives were allowed to discuss their company's plans for the year.

The program committee for the annual winter sales conference consisted of J. F. Zweiner, chairman, assisted by Taylor Brown, Gordon Dawson, Sam L. Hall, E. W. Meise, O. G. Thompson, and Lou C. Weise, plus the coordinating work of secretary-manager. A sales skit presented at the meeting will be carried in full in the next issue.

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © FEBRUARY, 1949

Attract the New Customers

says

Ken Hampton

Everywhere in the West we see new faces these days. A great migration is taking place and the electrical retailers of the West are on the receiving end of one of the greatest influx of new customers any business has ever known.

As merchants selling electrical appliances and equipment, we should consider two facts about these new families moving into our communities to become our customers:

1. Many of these families, perhaps most of them, are coming to us naked of their household goods. They are arriving here not only to buy or rent living quarters, but to obtain the necessary equipment to furnish them.

2. These new people are not accustomed to living at the high standard set by the use of labor-saving, comfort-giving electrical appliances that we have created for ourselves here. Quite generally they are from areas where utility rates for electrical energy are much higher. In their former homes they are almost sure to have had little or no familiarity with the use of electricity for cooking, water heating, cooling, heating, bed covering, frozen food keeping, dishwashing, the disposal of garbage, etc. In addition, the standard of lighting in homes, factories and business offices was probably lower.

This situation is both an opportunity and a challenge to Western appliance retailers. Here are some suggestions to help you turn this opportunity into profit for your store. You will undoubtedly think of others.

1. Be sure your store contains distinctive, readable signs, telling your store name and describing what you sell. These signs should be both on the inside and outside of your store.

2. Be sure all of your advertisements give your street address and, if possible, tell how to reach your store.

3. Advertise in all possible media consistently.

4. Restate your store hours often.

5. State clearly and repeat consistently any outstanding policy you have that leads to greater customer satisfaction.

6. Invite people to come and visit your store. By all means encourage your present customers to suggest that their friends and neighbors buy at your store.

7. Obtain, if possible, a list of the new people moving into your community and mail them a letter of welcome, telling about your store. In lieu of this, make consistent distribution of advertising by mail or house-to-house delivery to all homes in your market area.

8. Identify yourself and your store with the national and regional advertising of the manufacturers you represent. If permissible, prominently display the brand name or trademark of the appliances you sell. This will help attract former users of these products to your store.

As merchants in the West, you not only have some of the backlog of customer demand created by the war but you have a new market created by incoming families. These families not only have to be attracted to your store or sought out in their homes, but they have to be **sold** because they are not accustomed to our electrical way of life.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

February 1949

©

Come on Sunshine!

Wherever the sun began to shine and warm things up a little, business picked up again. To those still buried in snow and frozen up by the West's worst winter in half a century, let there be some sunshine in that news at least. If spring ever comes sales will come to blossom again too. Hold on!

Cold upsets many things

Northwest electric clocks slowed down as frequency was dropped to save fuel and water in power emergency (same as California last year). There were gas shortages in Salt Lake City as well as San Diego and many towns served by bottled gas tank cars. Pipes froze, calling for night and day duty from utility crews. It has been rugged and long. Appliance sales reflected it all over the West. Prompted some dumping and price cutting and wild trade-ins. Pressure from some factories, whose former warehouse space is all converted to production now, on dealers and distributors to take carloads of appliances, also bounced in some desperation selling tactics. Yet, come summer, there may be shortages again of these appliances, due to steel allocations.

Priced out of a job

Union demands for wage increases both from bench and clerical people at the California Electric Service Inc., San Francisco, raised already high costs over the break-even point so this company cancelled factory repair contracts on 28 traffic appliance lines and is closing out the repair business as unprofitable. Telechron and G-E clocks remain temporarily but may go also if costs eat up all the intake. Factory repair allowances on guarantees are not high enough to meet higher labor costs. Factories reply that repair cost now approaches factory cost to make an entirely new appliance. The union won a strike but lost many jobs.

Fire under Reg. W

Regulation W news seems to be in the making, although our Washington office says there's no likelihood of its relaxation soon. Many groups are pleading for some credit relief, claim high down payments, short terms, are making it impossible for wage earners to buy things at today's prices.

Market impact

Market Week in San Francisco at Western Merchandise Mart was better than at either Chicago or Los Angeles markets. Some complained of lack of buyers but there seemed to be plenty of seers and askers. Buying was more cautious but many seemed satisfied, others not. California dealers seemed reluctant to place orders until after March, to save inventory tax. Television and automatic washers were boomed by manufacturers. Other appliances showed improved models with new features. There were many changes noted in lineups—some shuffle of distributorships and personnel. Many factory executives out for the show—Raymond J. Hurley of Thor, A. C. Scott of Apex, H. C. Bonfig of Zenith, among them.

Among the new things seen in abundance during Market Week were these: Sues, Young & Brown showed a new Coolerator range with double-duty Well-E-Vator unit and automatic timing. Also the Coolerator space saver refrigerator model, and its 16 cu.ft. freezer adapted to frozen food display case for stores. . . Hotpoint's new automatic clothes washer was demonstrated several times a day. Has agitator action, a spin dryer powered by separate fluid drive, and over-flow rinse. Load, temperature and quantity of water can be controlled. Price is $299. Also on display was the improved Hotpoint dishwasher with self-sealing doors, stainless steel racks and electric drying. . . New in clock models was Telechron's circular kitchen clock with white numbers on the outer rim outlined against the wall. Comes in 4 different colors.

Quick trip among exhibits

O. B. Wilt Co. introduced the Economaster dual purpose range and water heater. Tanks of 20, 30, or 40 gal. capacity. Optional equipment is a portable oven which fits over the back burner. Also showed the Climax evaporative home cooler with adjustable louvers and three speed fans. . . The new Ironrite console cabinet model was displayed at Gordon E. Wilkins Co. Cabinet comes in blond or mahogony finish, looks like a piece of furniture. . . Dalco Appliance Co. introduced the 9 cu.ft. Amana combination refrigerator-freezer with separate doors, vegetable bins and stainless steel shelves. Will sell for $399.50.

'49 models shown

Westinghouse introduced its latest two-oven range with burners on the left, and priced at $374.95. Also showed its new 10 cu.ft. refrigerator model with freezer chest, butter keeper, etc. Had an 11 cu.ft. refrigerator on display, and Lois Ferris served from its new automatic coffee maker. . . Lavenson & Savasta will introduce two L & H range models in the spring—the Supreme with six surface units and two ovens, and the Shelburn combination range and trash burner. . . Apex's Scott, from Cleveland, says deliveries on its Wash-A-Matic automatic clothes washer will definitely get started in February. Comes in three models, the deluxe, standard and special, without automatic timing. Is offering a five-year warranty on the drive transmission. . . Frank Edwards Co. now has the Frostair refrigerator line as well as Deepfreeze and Thermador. Is showing the 7 cu.ft. Frostair model and will feature an "old refrigerator roundup" allowing $100 on old models. Had Thermador range models, T46 with a kitchen heater, T56, and a 6-burner all stainless steel range. Also new 18 cu.ft. Deepfreeze. Thermador's Ballman and Deepfreeze's Sanderson were on hand. . . H. R. Basford Co.'s main attraction was the new Zenith circular screen television models, and Gibson's new refrigerators and ranges, Whirlpool automatic washer.

More new things

Thompson Diggs Co. of Sacramento opened its new appliance division sales space at the Mart, with Bruce Wilson, formerly of Schuyler-Wilson, as manager. Jerry Schuyler had new space showing two new lines... Easy washer is liquidating its current spinner model to make way for an improved one with several new values, such as built-in water filter, special filling faucets. Fred Fenton says Easy's automatic may come out late in the summer. New wringer models are due in March. New spinner will remain at $199.50. . . Leo J. Meyberg Co. showed new Norge line, RCA television, Bendix, etc., and a new device, Freezchest, made in Palo Alto by Technical Products Co., a device to freeze or hold frozen food in an ordinary refrigerator.

And still more

Among new lineups—Ceazan Co. went out of distributorship in San Francisco and is now direct factory representative for several lines instead. Gave up its Mart space but will be back later, says Ralph Christie. Its Farnsworth-Capehart radio and television line now distributed by C. G. Hamilton Co., space 433. . . Leroy H. Bennett, now director of

New alignments

activities, No. Calif. Electrical Bureau, turned over the Monitor line to Albert Kessler & Co. for northern California. . . Dalco now has the Amana line and U. S. Television. . . Sues, Young & Brown have One Minute Washers for northern California. . . Lloyd Sutton now represents Whiting home freezers for 7 western states and Miss Mary Snow, home economist for Whiting, will work in the area assisting dealers.

Words and meanings

Speakers at the appliance, radio and now television dinner, Wednesday night, were H. Carl Wolf, managing director of American Gas Assn. and H. C. Bonfig, vp. of Zenith. O. R. Doerr, vp. of Pacific Gas and Electric Co. was chairman. Wolf revealed the powerful organization program to promote gas cooking, heating and refrigeration, so that electrical people now know what their competition is up to. Bonfig declared for sound manufacturers, honest merchandise and capable dealers to eliminate the overpricing, dumping, fictitious list prices, fake trade-in offers and commercial bribery that will run the industry into disrepute. TV and FM, said Bonfig, has a big future but will be bought by more critical people; therefore takes more intelligent selling. He made a strong case for his company's idea—Phonevision—TV with metered high class programs for which people will willingly pay as they do for good records.

Lamp package

First bright idea to create floor, table and pinup lamp sales for dealers since the war was launched in Southern California Edison territory after a test in Santa Ana. Full details will be in next issue. A "package" deal of five lamps with a big dealer margin and no warehousing or assembly costs was offered to dealers willing to put door-to-door crews in the field.

Fixtures too

Most practical selling program for home lighting fixtures was told dealers by Lightolier vice-president Ted Berk at a California Electric Supply Co. dinner in San Francisco. Deserves treatment in a Sales Guide in a future issue. This much neglected market—home lighting—needs cultivation.

Back West

John Wicht, vp. and gm. of Blackstone Washer Corp., addressed a hundred dealers in San Francisco at a Pioneer Appliance Co. meeting. Told how the 75-year old washer company sized the market, introduced its pre-war tested automatic in selected markets. Announced Pioneer Appliance as northern California distributor, Devlin-Drew for the valley and Western Supply Co., Salt Lake City.

New

Lee Distributing Co., owned by Lee Bornstein, San Diego, has been made a Thor distributor for San Diego and Imperial counties. Handles Packard-Bell in the area now, is prominent in Bureau of Radio & Appliances affairs.

Where

Radiant Glass Heating Corp. now has a western sales manager, Warren E. Marsden, 527 So. Figueroa St., Los Angeles.

Show

San Francisco National Home Show, sponsored by the real estate board, will open in the civic auditorium, Feb. 26 to March 5. Appliances will be shown by several distributors.

Office

Nick Dinkel, regional manager for Crosley, has now established an office on the 9th floor of Western Merchandise Mart, San Francisco.

Appointed

Intermountain Distributors, Salt Lake City, have been appointed distributors of Remler radios in the state of Utah.

Carrier Corp.'s latest air conditioner, 51H2 deluxe, has a special exhaust control to remove stale air and smoke, and a two-speed fan for draftless distribution. Model is backed by a five-year warranty. — Fresh air

Hotpoint's 1949 refrigerator line will have new exterior styling, more space, and adjustable stainless steel shelves. Added feature is a butter conditioning compartment located in the door. — Improved

Combination wire recorder and phonograph, called the Knight wire recorder, is a product of Allied Radio Corp. Entire unit is housed in a portable case. — Combo

Trade-in information on refrigerators, washers, vacuum cleaners and ranges is contained in the 1949 Trade-In Guide put out by the National Appliance & Radio Dealers Assn. Cost is $5. — On Trade-Ins

Department stores will soon be carrying ready-made valances for standard size windows--complete with fluorescent lamps and wiring, mounting devices, curtain rods and an extension cord. These packaged valances will be sold unfinished so they can be painted to match the walls. — Packaged valances

Sylvania has made two changes in its one-year fluorescent lighting fixture guarantee. Formerly limited to orders of 100 or more fixtures, the guarantee now applies to purchases of 25 or more fixtures. Restriction requiring that the fixture be installed in one location has also been removed. — Changes guarantee

Two new 6 cubic-foot home freezers announced by Deepfreeze offer an additional cubic-foot of capacity and extra features at the same retail price as the previous 5 cubic-foot models which they supplant in the company's line. Deluxe model C-6 will retail at $269.95 and model B-6 at $239.95. — More space

Combination range and refrigerator, called the General Chef, is a product of General Air Conditioning Corp. of Los Angeles. Units are available with two-unit electric range, or four burner gas range, combined with a 4 cubic-foot refrigerator. — Hot and cold

Another combination arrangement is the Howard Pulsaire cool air circulator—a table with a built-in cool air circulator. Measures 18 inches in height, with a top diameter of 18 inches. Price is $54.95. — Twosome

Lynn & Chemnitz has appointed Robert G. Golding as its northern California representative with headquarters in the Western Merchandise Mart. Golding formerly represented the firm in the Intermountain area. He succeeds Cleve O. Rosenberg. — New rep.

Michael G. DuBrow is the new district merchandiser for the Sparton radio and television line in the California area. He will headquarter at 1421 So. Flower St., Los Angeles. — Appointed

Sues, Young & Brown are building new headquarters at Exposition and Bronson in Los Angeles, which will serve as office, showroom and warehouse. Completion date is set for April. — Building

B. S. Tucker Associates, Los Angeles, discontinued the representation of Sparton radio and television products in the California territory at the beginning of this year. — Drops line

THE big advantage of the Monarch second oven is its *LOCATION*. Here is the only built-in oven at convenient counter-top level. Just lift the cover and there's the food — no bending, no stooping!

No other "second oven" offers the conveniences of this Monarch *Surface* Oven. It is a time-saver, a food-saver, a fuel-saver, a back-saver. It is 100% exclusive.

Here then, is today's most impressive and convincing electric range to demonstrate — most profitable to sell — and most enjoyable to use. Assure your '49 sales objective with the *Monarch 2-Oven Electric Roaster Range.*

MONARCH MALLEABLE RANGE CO.
3929 Lake Street Beaver Dam, Wis.

Monarch ELECTRIC 2-Oven Roaster Range

THE MONTH IN BRIEF

Vote Required on PUD Bonds

The Oregon State Supreme Court has ruled that a PUD may not issue or sell revenue bonds without approval of the qualified voters of the district. The decision was given in a case involving a bond issue by the Central Lincoln PUD, which had adopted an ordinance providing for the sale of $200,000 in revenue bonds. P. E. Fullerton, a patron of the district, brought suit in Lincoln County District Court to prevent the sale. The district court judge held approval by voters of the district was necessary, and the Supreme Court affirmed the decision.

Amendment Will Be Asked

The Washington Public Utility Commissioners Assn. will ask the state legislature to amend the public utility act to permit system-wide acquisition of privately owned electric properties. The amendment would permit two or more districts, acting jointly, to perform any functions now permitted to a single district. Under existing legislation, a PUD can buy properties in its own district only.

Electrical Legislation in the West

A new state electrical inspection law is being proposed before the Utah state legislature, sponsored by the inspectors association; in Idaho the 1947 law is being redrawn and amended by the contractors association for submittal to the legislature; in Washington amendments are being proposed to the state law by the Electric Club of Washington. The Utah bill would bring public buildings, presently exempt, under inspection, also include sales control on substandard appliances. Idaho's original bill did not legally provide for inspection and inspectors. The Washington bill would add sales control to licensing provisions.

Fight Over Qualifications

In California the AGC, general contractors organization, threatened the State Contractors License Law's requirements for qualifying technical examinations for electrical and plumbing licenses. Since the Horwith case in Fresno the state qualifications have been the only ones permitted. Local examinations for licensing were ruled invalid. If the threat is pressed, a battle over the issue will be fought by the electrical contractors associations of that state.

Point of Diminishing Returns

When the demands of an organizer for a service shop branch of IBEW were made uneconomic to operate under and a prominent San Francisco appliance repair shop was picketed, affecting the company's wiring business where there was no labor dispute, the proprietor just closed the repair business. Everybody lost.

Cold Increases Northwest Problem

Severe cold in the Northwest brought a request from the Northwest Utilities Conference Committee to power users to reduce consumption by 15% over each 24-hour period. Previous attempts at conservation during peak from 4:30 to 6:30 p.m. were inadequate in view of the unusual weather. Low water and icing conditions had caused a deficit in power supply of nearly 300,000 kw., approximately 15% of the average Northwest Power Pool load, the committee said. Output was maintained only by drawing heavily on water storage reservoirs, the statement continued, and if these reservoirs should be drawn below the levels required for maximum efficiency, the result would be to aggravate an already serious problem; the only alternative to voluntary reduction of power would be action which would close down many industries. Major relief was not expected until temperatures rose east of the Cascades to increase the flow of Columbia River tributary streams. Generation at Bonneville Dam was down to 350,000 kw., as compared to 421,000 kw. before icing reduced stream flow.

B. C. Orders Modified Rationing

A record five-week freeze cut B. C. watershed run off by one-third, brought a drop in water reserves of more than 1,500,000 kwh. daily at major hydro plants. Armed with authority of the B. C. Public Utilities Commission, B. C. Electric ordered a modified power rationing at midnight, Jan. 20, after voluntary reduction failed to halt the drain by more than 10%. Commercial users were to turn off all illuminated signs, outside lights and show windows; reduce inside lighting by 50%. Residential customers were to stop use of portable heaters, porch lights, outside lighting, reduce inside lighting by 50%.

Consumer Cooperation Good

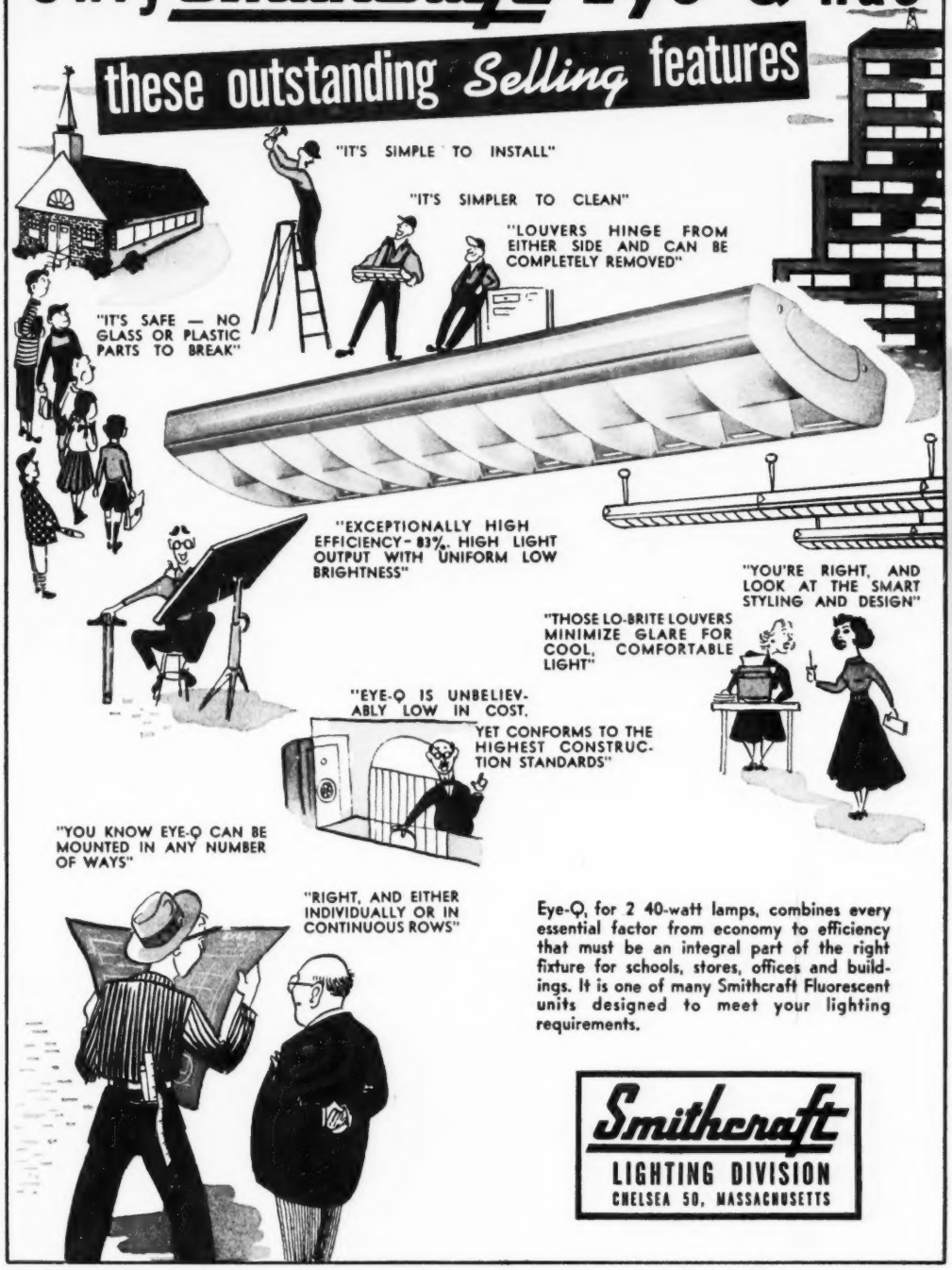
Good customer cooperation on power curtailment was reported from the Northwest. Housewives reduced use of irons, heaters, lamps, etc.; business houses turned off neon lights during the peak and industrial users, in some cases, staggered employment to escape peak-hour consumption. Seattle turned on its street lights 25 minutes later than usual, removed some lamps in the downtown area. Portland observed an almost complete voluntary brownout at peak hours; firemen were recruited to call attention of businessmen to wasteful power uses.

Leaders Suggest Remedies

As a means of meeting the Northwest power problem, Kinsey M. Robinson, president, Washington Power Co., advocated a corporation to take over federal power facilities in the region. Public and private operators should join in forming such a corporation, he said. The corporation would lease from the federal government its transmission systems in the area, expand them where necessary and possibly install additional generators at future multiple-purpose dams to be built by the government. Other proposals were a Columbia Valley Authority, advocated by Congressmen Hugh Mitchell and Henry Jackson, and a plan for an interstate compact, advanced by Mayor William F. Devlin of Seattle. Governor Langlie of Washington in his inaugural address urged consideration of state construction of hydro dams in the Columbia Basin; suggested legislation to strengthen working relations between public and private power. Plan of a private corporation to build a $12,000,000 hydro plant on the Deschutes in Oregon is reported on page 138.

Only Smithcraft Eye-Q has

these outstanding *Selling* features


"IT'S SIMPLE TO INSTALL"
"IT'S SIMPLER TO CLEAN"
"LOUVERS HINGE FROM EITHER SIDE AND CAN BE COMPLETELY REMOVED"
"IT'S SAFE — NO GLASS OR PLASTIC PARTS TO BREAK"
"EXCEPTIONALLY HIGH EFFICIENCY - 83% HIGH LIGHT OUTPUT WITH UNIFORM LOW BRIGHTNESS"
"YOU'RE RIGHT, AND LOOK AT THE SMART STYLING AND DESIGN"
"THOSE LO-BRITE LOUVERS MINIMIZE GLARE FOR COOL, COMFORTABLE LIGHT"
"EYE-Q IS UNBELIEVABLY LOW IN COST, YET CONFORMS TO THE HIGHEST CONSTRUCTION STANDARDS"
"YOU KNOW EYE-Q CAN BE MOUNTED IN ANY NUMBER OF WAYS"
"RIGHT, AND EITHER INDIVIDUALLY OR IN CONTINUOUS ROWS"

Eye-Q, for 2 40-watt lamps, combines every essential factor from economy to efficiency that must be an integral part of the right fixture for schools, stores, offices and buildings. It is one of many Smithcraft Fluorescent units designed to meet your lighting requirements.

Smithcraft
LIGHTING DIVISION
CHELSEA 50, MASSACHUSETTS

SLIMLINE LAMPS

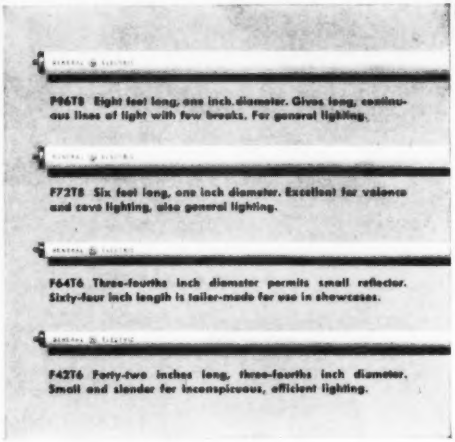
Available IN QUANTITY for the first time!

Amazing new G-E slimlines offer you the greatest promotional opportunity in years.

Here's the biggest news in fluorescent since General Electric developed the first practical fluorescent lamp over 10 years ago! G-E slimline fluorescent lamps—world's most advanced source of light—are now available in quantity!

Think of the customers for slimline lighting—stores, offices, factories, schools, restaurants, theaters, showrooms, bowling alleys! Just think of all the new lighting business you can get with this great new product!

Four sizes of General Electric slimline lamps are available for general and special lighting applications. And many new, improved fixtures made especially for G-E slimlines are now on the market. For full information on G-E slimline production, price, application and promotion, contact your G-E lamp office today!


F96T8 Eight feet long, one inch diameter. Gives long, continuous lines of light with few breaks. For general lighting.
F72T8 Six feet long, one inch diameter. Excellent for valance and cove lighting, also general lighting.
F64T6 Three-fourths inch diameter permits small reflector. Sixty-four inch length is tailor-made for use in showcases.
F42T6 Forty-two inches long, three-fourths inch diameter. Small and slender for inconspicuous, efficient lighting.

LATEST ACHIEVEMENT OF THE G-E LAMP RESEARCH THAT HAS

ARE HERE!

Now you can CASH IN on G-E's development of the slimline lamp!

EIGHT BIG NEW SELLING ADVANTAGES

1. MODERN, STREAMLINED APPEARANCE. General Electric slimlines — up to eight feet in length — provide long, continuous lines of light for unique architectural effects.

2. INSTANT START. No starters are used. Just flick the switch for sure, instant starting. Special ballast provides necessary starting voltage.

3. HIGHER EFFICIENCY. Slimlines are the most efficient fluorescent lamps made.

4. EASIER TO INSTALL AND MAINTAIN. Single pin base fits new push-pull type socket. One man can easily install and replace.

5. SIMPLIFIED WIRING. Elimination of starter simplifies wiring, reduces maintenance.

6. THREE BRIGHTNESS LEVELS with one lamp. Operate G-E slimlines at 100, 200, or 300 milliamperes by changing ballasts only.

7. BETTER LIGHT CONTROL. Small diameters permit use of smaller reflector to give better direction of light.

8. LONG LIFE. Although the last published rated life was from 2500 to 6000 hours (depending on frequency of "on" and "off") many users are reporting considerably longer life.

G. E.'s powerful advertising campaign breaks the good news to your customers

News about G-E slimlines is getting big, nationwide coverage with spreads in Time, Newsweek and Business Week, followed by more hard-hitting ads, all reaching *your* customers. Look for these ads (Post, February 19; Time, February 21 and March 21; Business Week, February 12 and March 12)! They mean more slimline sales for you!

Call your General Electric lamp office today and get set for G-E slimline fluorescent lamp business.

G-E LAMPS

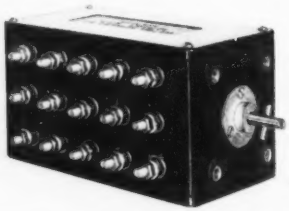
GENERAL ELECTRIC

PIONEERED ALMOST EVERY MAJOR DEVELOPMENT IN FLUORESCENT

Lapp Insulator Co. Inc. Lapp, N.Y.
UNITED STATES RUBBER COMPANY US TRADE MARK
BURNDY Engineering Co. Inc. NEW YORK, U.S.A.
EARL S. Condon COMPANY
Engineering Representatives
1151 S. BROADWAY - LOS ANGELES 15, CALIFORNIA, PRospect 8375
Slater ELECTRIC & MFG. CO. Cole ELECTRIC CO.

The famous, extremely simple, efficient ROTO-TEST SWITCH requires only 4" x 4" space, applies to any type of switchboard. Made in 4 to 20 pole combinations, a turn of the key throws switch into testing position without disconnecting instruments and meters from service.

TEST KEY
Also available in batelite pistol-grip, round-knurled and oval types.

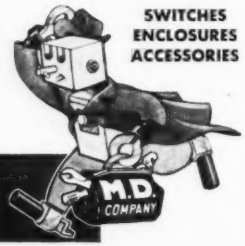


TEN POLE
COMBINATION UNIT 4x4x6

The ROTO-TEST SWITCH for Relay and Meter Testing or any circuit transfer. Eliminates all hazards to which an operator or tester is exposed. Write for detailed information.

WESTERN SALES REPRESENTATIVES
FRED W. CARLSON, 307 Wall St., Seattle, Wash.
JOHN G. CORRIN, 600 S. Highland Ave., Los Angeles 36, Calif.

SWITCHES
ENCLOSURES
ACCESSORIES



METER DEVICES
COMPANY • CANTON, OHIO

PRIVATE INTERESTS FILE FOR DAM PERMIT

Plans for a $12,000,000 hydroelectric development—the Pelton project—on the Deschutes River in central Oregon have been announced by Pacific Power & Light, Portland General Electric and Washington Water Power companies. Application for preliminary permit has been filed with the Oregon State Hydroelectric Commission.

Articles of incorporation for the enterprise were filed under the name of Northwest Power Supply Co., Thomas M. Robins (retired army engineer, who directed construction of Bonneville Dam), president; Howard W. Turner, Madras, vice-president, Hillman Lueddemann, Portland, secretary-treasurer.

The new corporation is not a subsidiary of the three power companies sponsoring the development. The companies will contract for the entire plant output, however.

The plant would be located in an 800-ft. canyon six miles northwest of Madras. It would produce 75,000 kw. of power within two years and 112,500 kw. ultimately.

Plans call for an arch-type dam, 100 ft. high from foundation to crest, with an average width of about 200 ft. Width at bottom of the canyon would be only 150 ft., tapering to about 500 ft. at the crest of the structure. About 85,000 cu. yd. of concrete would be used in construction.

Integrating lines to connect with the transmission grid of Bonneville Power Administration through the central Oregon lines of Pacific Power & Light Co. are proposed. Negotiations for an interchange contract with BPA are under way. Under the proposed arrangement, the three companies would take delivery of power into their distribution systems through existing interconnections with Bonneville and replace these deliveries with an equal amount of power from the Pelton plant.

Tentative orders totaling more than $2,400,000 have been placed for major items of electrical equipment and turbines required for the development. Work will be pushed on engineering designs during the period required to secure state and federal licenses. If these licenses are obtained promptly, it is estimated the project can be completed by the winter of 1950-51, at least four years before McNary Dam can be brought into production.

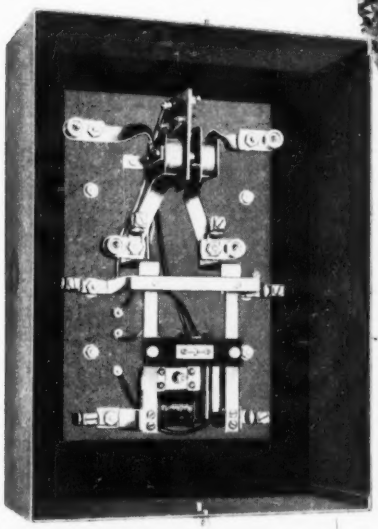
• Announcement of the proposed project brought immediate opposition from fishing interests, which charged

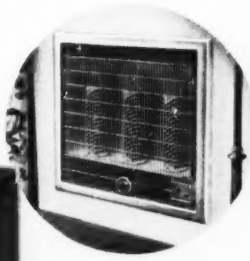
DOMESTIC LOAD CONTROL

Automatic load regulator gives higher load factor, better service

The Wesix Load Regulator is easily installed on the house side of the service switch, and is designed to control heating load by means of metered demands of range and lighting loads. When the range and general household load exceeds a predetermined value set by the individual utility between two and seven kilowatts—the heating load is automatically reduced by operation of a double throw switch connecting the heating circuits to 120 volts, thus reducing the heating load by 75% at time of critical peak.

WESIX LOAD REGULATOR REDUCES SPACE HEATING DEMAND BY 75% AT TIME OF SYSTEM PEAK





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By providing automatic unit type heaters in each room the total space heating load is broken up into many small parts, assuring high diversity, as only a small percentage of the heaters are ever operating simultaneously.

UTILITY COST $50.00

For full information write to

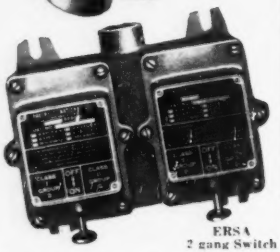
WESIX ELECTRIC HEATER CO.

390 FIRST STREET SAN FRANCISCO 5

Explosion-Proof and Dust-Tight

PYLETS

VA Sealing Pylet



ERSA 2 gang Switch

Hazardous Location Wiring Is Handled EASILY and SAFELY

with this line of explosion-proof and dust-tight Pylets. Substantial construction with heavy cast metal galvanized bodies, overlapping screw covers, and union type conduit hubs provides the protection required for this class of wiring. Junction Pylets are available in a full range of types and sizes, with up to 8 conduit hubs. Type VA Sealing Pylets have removable covers which can be mounted in any one of four positions for pouring sealing cement. Consult your Pylet catalog 1100 for complete listings of all types.

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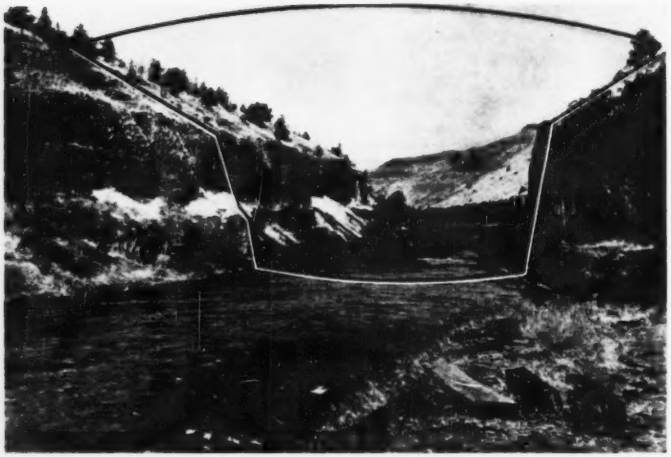


Proposed Pelton dam site on the Deschutes River, near Madras, Oregon

that the dam would hurt salmon spawning and would disrupt the federal government's plan to develop a fish hatchery on the Metolius River, a tributary of the Deschutes. A bill, approved by the state fish commission and now before the state legislature, would prohibit further construction of dams in the Deschutes.

The sponsors of the project, however, have proposed construction, subject to approval by conservation agencies, of a modern fish hatchery downstream from the dam site.

Since the proposed dam site is on federal land, the corporation will ignore the Oregon law that permits the state to take over any power project within two years.

A barrier to the proposed development is an application filed in 1941 by the now inactive Central Oregon PUD for a license to build a dam on a site that would be flooded by the Pelton project. The PUD has prior right until 1951. Negotiations or court action would be required to nullify this right.

B. C. Commission Buys Vancouver Island Plant

Purchase of the power plant of the Vancouver Island Utilities Ltd. by the B. C. Power Commission at Campbell River, B. C., has been announced. The plant was purchased for $129,500.

The commission has taken over the 25-cycle plant and is now serving about 800 customers. It is starting conversion to 60 cycles and has completed an agreement with the city of Courtenay, B. C., to take over the 25-cycle system of that city on April 1. Conversion from 25 to 60 cycles in the Courtenay - Cumberland - Royston area will be deferred pending delivery of transformers and equipment.

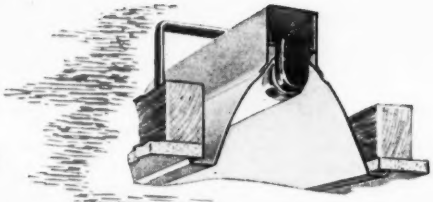
Edison Company Schedules New Power House on San Joaquin

Southern California Edison Co. is planning to build a new hydroelectric power house on the San Joaquin River in the High Sierra. This will be the sixth power house in Edison's Big Creek hydroelectric project, and it is estimated that the new plant will be in operation early in 1952.

To cost approximately twenty million dollars, the new power house will have a capacity of 84,000 kw. in two generating units. Application for license to construct and operate the plant has been filed with the Federal Power Commission and application for a certificate of public convenience and necessity also has been filed with the California Public Utilities Commission.

The new Edison power house will be above Pacific Gas and Electric Co.'s reservoir for its Kerckhoff plant, and just below Edison's Big Creek No. 3 plant. An arch-type concrete dam 228 ft. high and 1,200 ft. long will create a reservoir holding approximately 35,000 acre ft.

With the completion of this new hydro plant, the total generating capacity of Edison facilities in the Big Creek area will be well over half a million kilowatts, and the capacity of the company's combined hydroelectric and steam-electric generating system will be approximately 1,670,000 kw.



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PLANNED LIGHTING . . .
TALK ABOUT . . .

Curtis EYE-COMFORT TROFFERS

FIRST NATIONAL BANK
Chicago, Ill.

Illustrated above is a partial view of one of the many departments in the First National Bank of Chicago, showing its installation of A B C Lighting. Approximately five miles of Curtis "Eye-Comfort" Troffers have been installed, providing seventy footcandles of glareless illumination on the working plane.

Curtis "Eye-Comfort" Alzak Aluminum Troffers . . . easily installed and maintained . . . utilize the new 40 watt, T-17, 60-inch low-brightness lamp. The reflector contour approximates a parabola and is designed to direct a maximum amount of light to the working plane but limits the amount delivered to the eye . . . true A B C Lighting.

Appropriate Brightness Control, the big feature in modern lighting. The Key? . . . the luminaire . . . the CHARACTERISTICS? . . . high light utilization with low unit brightness. PLUS the relationship of the chromatic values of room contents. Write Curtis for further details . . . for easier sales.

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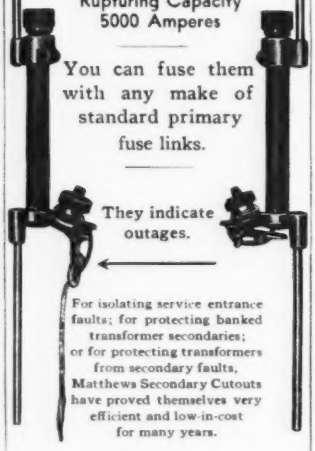
MATTHEWS SECONDARY CUTOUTS.

Rating:
100 Amperes 250 Volts
Rupturing Capacity
5000 Amperes

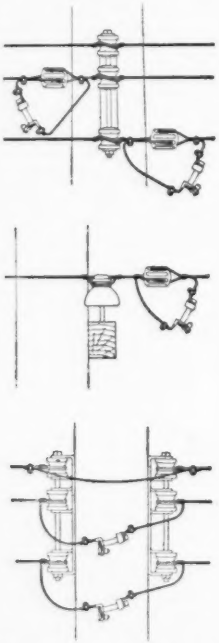
You can fuse them with any make of standard primary fuse links.

They indicate outages.



For isolating service entrance faults; for protecting banked transformer secondaries; or for protecting transformers from secondary faults, Matthews Secondary Cutouts have proved themselves very efficient and low-in-cost for many years.

For Sectionalizing as shown below.



Send for Bulletin 101-A.

W. N. MATTHEWS CORPORATION
ST. LOUIS, U. S. A.

FUNDS RECOMMENDED FOR BONNEVILLE PROJECTS

Bonneville Administrator Paul J. Raver has listed major transmission projects to be constructed with the $51,500,000 funds and contract authorizations recommended by President Truman in his budget message.

The recommended budget requests cash appropriations of $33,000,000, including $28,650,000 for construction and $4,350,000 for operation and maintenance, together with $18,500,000 contract authorization. Of the $28,650,000 construction cash, $10,500,000 will be required for previous contract authorizations, leaving $18,150,000 for new construction.

Funds asked for key areas are listed as follows:

1. Facilities to serve Seattle, Longview, Portland and southwest Oregon with Grand Coulee power—cash, $10,470,000; contract authorization, $8,097,000; total $18,567,000.

2. Facilities to serve Snohomish, Seattle, Olympia, Grays Harbor, Shelton and Port Angeles areas—cash, $4,344,000; contract authorization, $655,000; total $4,999,000.

● CONTRACT for structural steel for a 24.4-mile power line from North Bonneville, Wash., to Troutdale, Ore., has been awarded by the Bonneville Power Administration to Bethlehem Pacific Coast Steel Corp. of South San Francisco on a bid of $445,900. The steel tower line will carry a 230-kv. double circuit to increase power supply to Portland and lower Columbia River industries. The line will be energized next November.

● CONTRACT for construction of 27.3 miles of the Shelton-Fairmont transmission line in Oregon has been awarded by the Bonneville Power Administration to Montgomery Electric Co., Portland, on a bid of $114,023. Other Bonneville contracts: clearing 5.4 miles of right-of-way for the Mapleton-Reedsport tranmission line, awarded to Cascade Construction & Engineering Co., $65,000; clearing right-of-way for section of the Lyons-Lebanon transmission line, awarded to Paul Helmich, Seattle, $82,700; construction of Index-Snohomish section of the Foster - Snohomish transmission line, to Smith Bros., Vancouver, Wash., on bid of $578,165.

● REA has approved a $1,320,000 loan for the Graham County Electric Cooperative, Pima, Ariz. The loan will finance construction of 166 miles of line and four 1,000-kw. generators. A two-way radio communications system for the co-op's loop also will be constructed. Another REA loan to an Arizona co-op is the $320,000 allocated the Duncan Valley Electric Cooperative. The fund will be used to construct 35 miles of transmission line and provide facilities to serve 75 new irrigation pumps.

Pacific May Buy Power From Lumber Company

Pacific Power & Light Co. is investigating the possibility of purchasing 20,000,000 kwh. of power a year from the Cascade Lumber Co. of Yakima, Wash., George T. Bragg, vice-president and general manager of the power company, has reported.

The lumber company is now installing two new boilers to replace nine that were installed as early as 1903. When the installation is completed, early this year, a four- to five-month survey will be made to determine if mill-supplied fuel will be adequate for three boilers, according to James D. Bronson, mill president. If the survey shows supplies are adequate and a deal is closed with the power company, the third boiler and steam turbines will be installed by the end of this year.

Engineering studies have been made jointly by the two companies to determine the feasibility of the project.

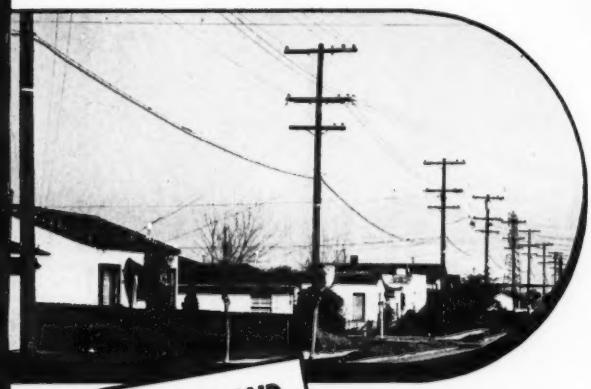
The modified sterling type boilers are to be housed in sheet metal quonset huts, with 195-ft. smokestacks. Each boiler will provide 50,000 lb. of steam an hour.

● DELIVERY of 2,500 kw. of interruptible power to the Buffalo Electro-Chemical Co. at Vancouver, Wash., is provided in an agreement between Bonneville Power Administration and the Clark County PUD. The Buffalo company is negotiating for a Vancouver site for a plant which would represent an investment of several million dollars. Eventual power requirements probably would be 10,000 kw.

● ALLIS-CHALMERS has been awarded a USBR contract for Hoover Dam equipment. Totaling more than $4,000,000, the award covers two 115,000-hp., 430-ft.-head, 180-r.p.m. hydraulic turbines and two 82,500-kva., 16,500-volt generators similar to units previously installed at the plant.

● CONTRACT for grading the plant site for a new rod, wire and electrical transmission cable plant at Vancouver, Wash., was awarded by the Aluminum Co. of America to Erland & Blickel of Vancouver.

HANG THE LOAD ON HUBBARD HARDWARE!



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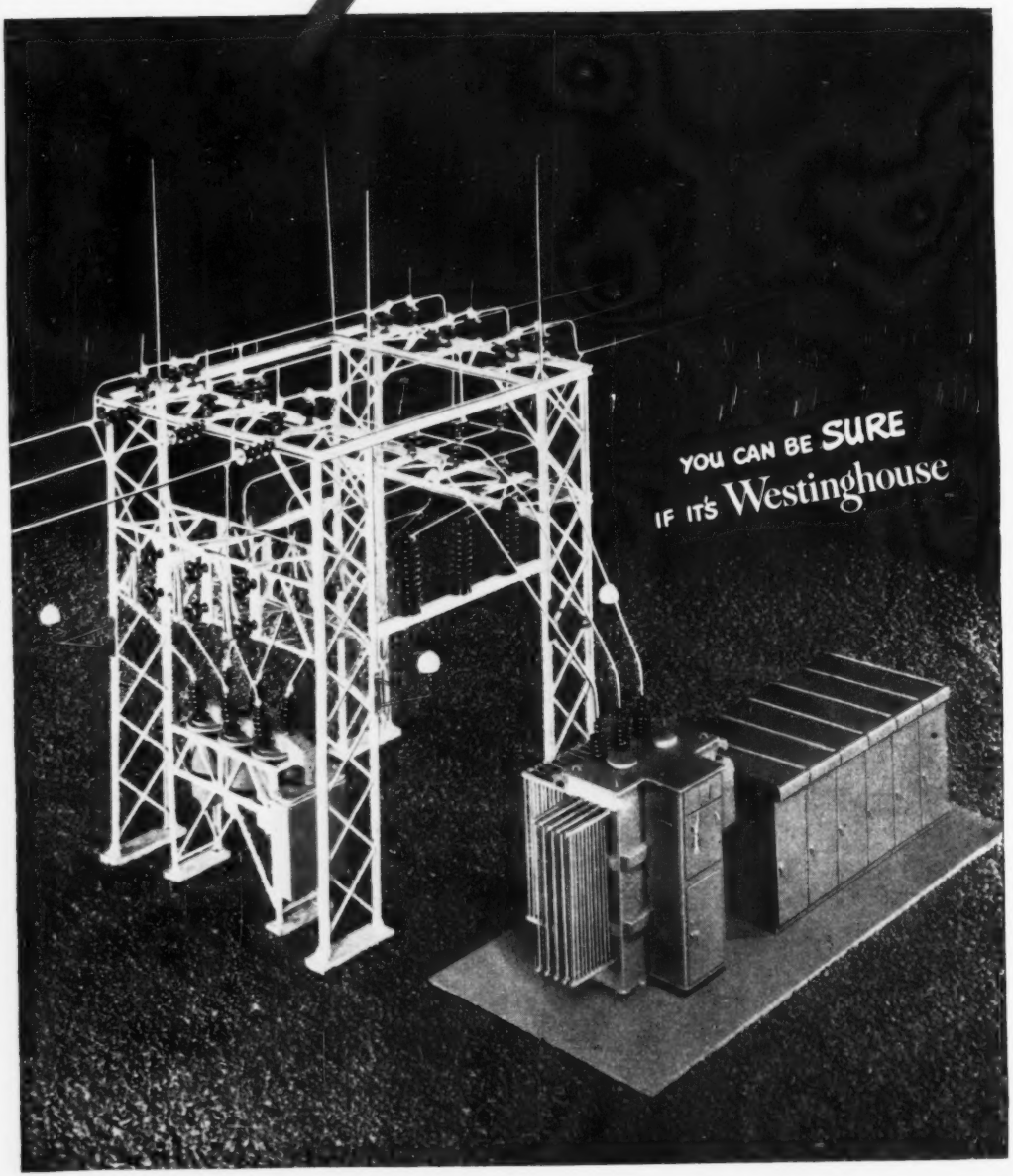
Why BUY A FACTORY



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here are 3 very important reasons

FLEXIBILITY: Each component is designed to permit future expansion with minimum changes or additions. Due to their compactness and "unitized" type of construction, capacity can be readily added or removed, with maximum salvage value.

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TRANSERT BRUSHES
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PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
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The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

INDUSTRIAL ELECTRONICS CORP.
MAIN PLANT Newark 2, N. J.

SECOND ALUMINUM PLANT PROPOSED FOR B. C.

A second large aluminum plant is in prospect for British Columbia if an adequate site and power supplies are available.

J. L. Reynolds, vice-president of Reynolds Metals Co. of Richmond, Va., announced after conferences with provincial government officials in Victoria in mid-January that his company would start surveys for an aluminum plant site on the B. C. coast during the spring.

The Reynolds Co. is discussing a plant to produce a billion pounds of aluminum annually requiring a million horsepower.

Reynolds declined to make any estimate of expenditures if his company goes ahead with plans for a plant, but it is assumed the outlay would approximate that already contemplated by the Aluminum Co. of Canada, which announced plans for a B. C. plant some months ago.

The Aluminum Co. of Canada has made a series of preliminary surveys along the coast, with further studies planned, and McNeely Dubose, vice-president, has estimated an expenditure running to $300,000,000 if his project proceeds.

Town Negotiating for Alaska Power Plants

The Cordova, Alaska, town council is negotiating purchase of the plants and distribution facilities of the Alaska Public Utilities now serving the city. The company's franchise gives the town an option to purchase upon giving a year's notice of intention, which the town now has done.

The town also is interested in developing a hydroelectric power plant on Power Creek, about seven miles from Cordova. It has asked Delegate E. L. Bartlett to include the community in a bill before Congress which would authorize the Interior Department to construct and maintain power projects in Alaska for the benefit of communities affected.

● Superintendent E. R. Hoffman of Seattle City Light has asked the city council to appropriate funds to purchase a site for a building to be used as the system's load dispatching headquarters. From a high tower surmounting the building, communications will be exchanged by direct air-beam with major substations throughout the city, thereby quickly informing operators at these stations of fluctuations in the load situation.

The faster your new lines and extensions are completed, the sooner your revenue begins.

There are several ways in which Oliver can help you speed this erection work. First, Oliver Pole Line Materials are readily available from a nearby distributor. Second, the Oliver line is complete, so that you can order all the items you need from one source. Third, Oliver products are accurately made, and are readily installed.

SPECIFY Oliver Pole Line Hardware for highest quality, dependability and overall economy.

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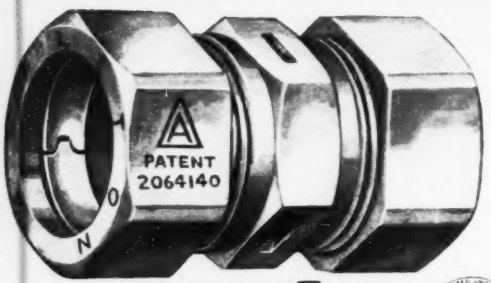

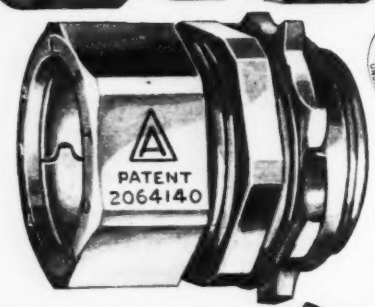

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Appleton leadership in couplings and connectors is maintained by highest possible precision standards. All sizes now are Underwriters' Laboratories approved rain-tight and concrete-tight.

Positive Grip—Precision construction of the concave, split compression ring in every coupling and connector, makes a joint that is absolutely rigid and permanent.

Bonded Connection—Bonding type locknuts, along with high knockout closing shoulders, provide an equally rigid connection to outlet boxes, panel boxes, and other equipment.

Time Savers—Couplings and connectors are designed for utmost speed and ease in making any installation. Both center sections and nuts are hexagonal to give a good "bite" with wrenches, even in unhandy places.

Competitively Priced—Appleton leadership is based on efficient, modern, mass production methods, as well as the skilful design and quality of its products. That is why they can be priced competitively.

Like all of the 15,000 fittings in the COMPLETE APPLETON LINE, Appleton Couplings and Connectors are "STANDARD FOR BETTER WIRING!"

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Big Appleton Catalog, illustrating and describing more than 15,000 types and sizes of wiring equipment, gladly sent FREE, on request, to any user of such material.

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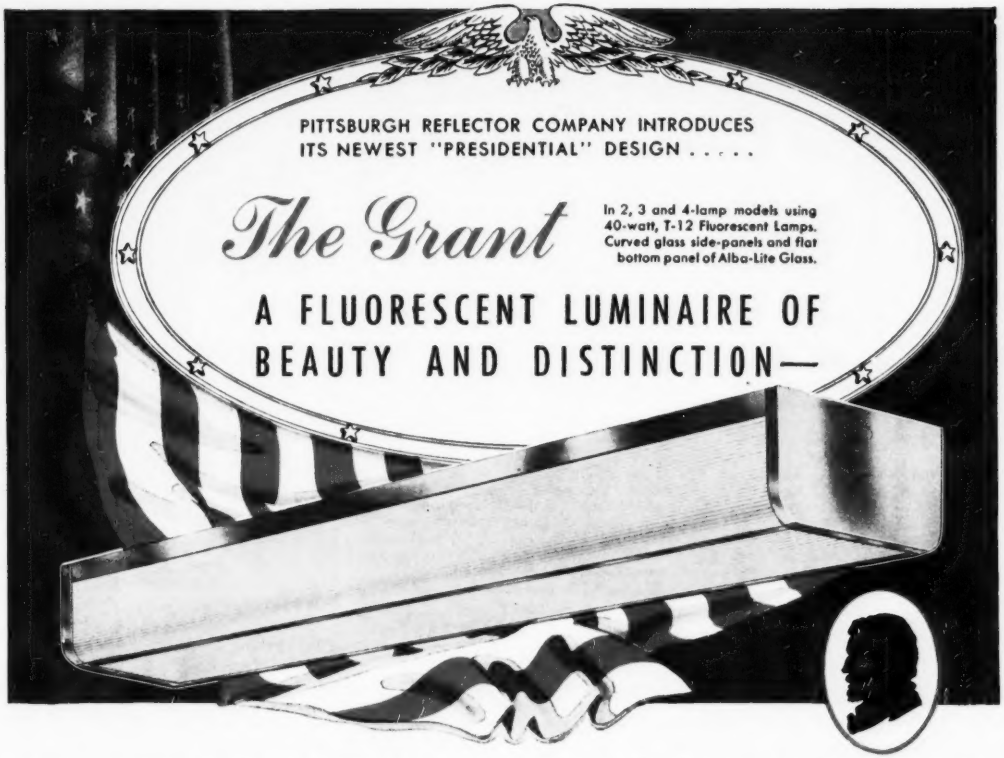
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The Grant
In 2, 3 and 4-lamp models using 40-watt, T-12 Fluorescent Lamps. Curved glass side-panels and flat bottom panel of Alba-Lite Glass.
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Flexible and functional in design, the completely glass enclosed A-8000-A Presidential Luminaires are outstanding in appearance and style and are equally adaptable to surface or pendant mounting, individually or in continuous row. When surface mounted, end-to-end, the "bridge-truss" chassis construction of "The Grant" Series insures snug ceiling fit and gives that desired "built-in" appearance. Patented hinged construction of the bottom panel permits quick and easy maintenance.

"The Grant" Fluorescent Luminaires are typical of the scientifically designed, individually styled equipment you get when you specify "Pittsburgh Permaflector"... for here is a line which gives you your choice of the correct fluorescent and incandescent units—or a combination of both—that you need for producing the "exact" illuminating results required by your individual applications.

"Planned Lighting" becomes a simple matter, quickly and easily obtained when you use standard Pittsburgh Permaflector units . . . for this flexible equipment creates the visual and architectural effects you want.

Why not check this superior lighting equipment before laying out your next lighting installation?

GET THE FULL STORY OF HOW TO ACHIEVE CUSTOM LIGHTING RESULTS WITH STANDARD EQUIPMENT

Clear, concise and up-to-date—Catalog 48-F gives specifications, illumination values, descriptions, uses, application suggestions and other pertinent data on Pittsburgh Permaflector Fluorescent Equipment and Companion Incandescent Equipment.

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" . . . an electrician . . . cannot afford to be without this tool," says the Frey Electric Co., Cincinnati, after "on-the-job" tests with KETT Borer. In one test, twelve joists were bored with hand brace and bit and ladder; time per hole, 21 seconds. With the "Tall Reach" Borer, time: 5 seconds per hole. A 4½ hour hand job drilled in 1½ hours. This user states that other savings include: easy mobility over house-building debris, absence of fatigue, no wasted "waiting time" for master electrician and ease with which trainees learn correct hole boring.

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UTILITY PURCHASES APPROVED IN ARIZONA

Two utility sales totaling $232,178 have been approved by the Arizona Corporation Commission.

In the larger, Central Arizona Light & Power Co. purchased the Gila Bend light plant and distribution facilities from Arizona Edison for $195,178.

In the other, Arizona Edison purchased the Gibson Water Co. and Southern Utility System & Supply Co. of Ajo for $37,000.

Because the system already is in good shape, Central Arizona Light & Power plans no improvements or additions to the Gila Bend property. Henry Sargent, president, said that the only change would be a lowering of rates to conform with Phoenix power tariffs.

Seattle Street Lighting Modernization Under Way

Seattle has completed the first installation in its $4,000,000 street lighting modernization program but further work is being delayed by the necessity for making arrangements with utilities using existing poles.

Some poles are used jointly by City Light, Puget Sound Power & Light Co., the Transit System, the Pacific Telephone & Telegraph Co. and the alarm systems of the police and fire departments.

The first installation extends for 2,000 ft. on Montlake Blvd., adjacent to the University of Washington pavilion.

The complete program will affect 330 miles of the city's major streets, using existing poles in more than half the cases. When present poles are used, a mast arm brings the light from 6 to 12 ft. from the pole over the pavement, at a height of 31 ft. One-eighth of the program is scheduled for this year.

Installations will be of the mercury-vapor type using an improved luminaire. The lamp sheds light in a uniform pattern over the entire pavement area rather than directly below the pole.

● A BAN on issuance of new electrical wiring permits was lifted by the Port Angeles, Wash., city commission after it had been in effect for eight days. The ban was enforced after State Examiner J. R. Bowen had ordered payments stopped on a new diesel generator because the city commission had not set up funds for the $90,000 purchase. Finance Commissioner Vernon J. Robinson, who had just taken office, said he believed the city could economize elsewhere so people could get electricity.

SURCHARGE ON PUD BILLS TO PAY FLOOD DAMAGE

Okanogan County (Wash.) PUD has placed a surcharge of 10% on all customer billings to pay for $175,000 flood damage last year.

"The district is financially indebted to the Bonneville Power Administration for all the material and labor assistance supplied in connection with this emergency," Manager W. L. Barbee said in a letter to customers. "Besides, the district is faced with an indefinite amount of flood repairs still to be made in its system."

The district had tried to obtain assistance from federal agencies but had been able to get only a $3,078 grant of construction materials from the Federal Works Agency, Barbee said.

In addition to the surcharge, which became effective Jan. 1, the PUD set new rates for residential, commercial and irrigation and spray services to make "uniform all basic rates applicable to all customers within each class of service."

The PUD recently sold $500,000 in revenue bonds to finance a Twisp substation and feeder lines, a new office in Okanogan and various service extensions.

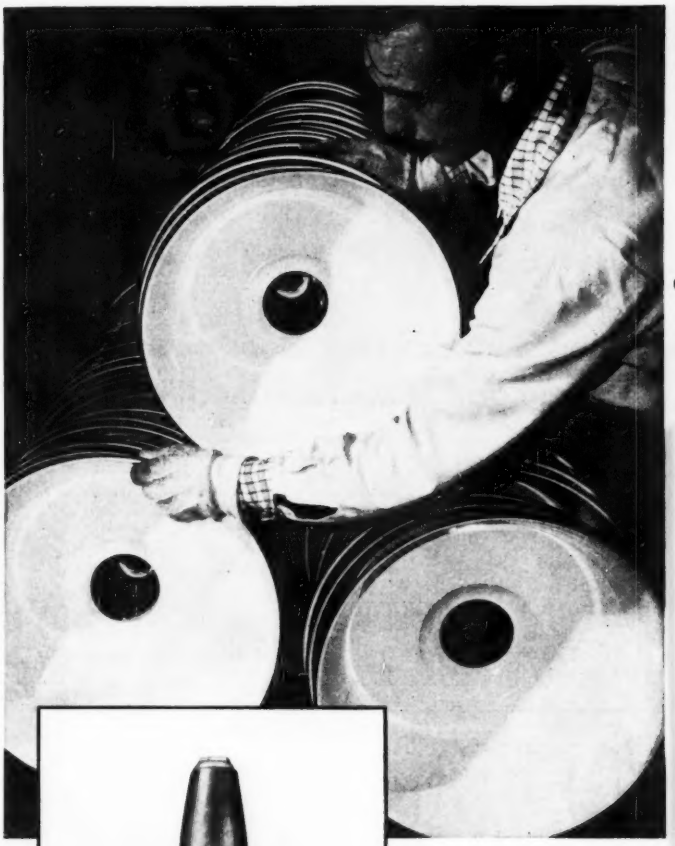
Companies Apply for First Rate Increase in 25 Years

Rate increases which would restore rates to those prevailing at the end of the war have been proposed in applitions filed with the Oregon public utilities commissioner by Portland General Electric Co. and the Pacific Power & Light Co.

The PGE increase would apply to all customers except those in Salem and West Salem, and would add $1,900,000 to the company's annual revenue. The PP&L increase, amounting to $366,000, would apply only to Multnomah County, including Portland and Rainier, Ore.

Increase would be from 85 cents to $1 for 25 kwh., from $2.85 to $3.05 for 100 kwh., from $5.75 to $6.60 for 500 kwh., and from $7.50 to $9 for 800 kwh.

The petitions cite that the increases are needed to provide new working capital and insure a reasonable rate of return on investments. First increases asked by either company in 25 years, they would retract the rate reductions made since the war ended. Since then Pacific Power has spent $17,000,000 and PGE $18,000,000 to expand facilities.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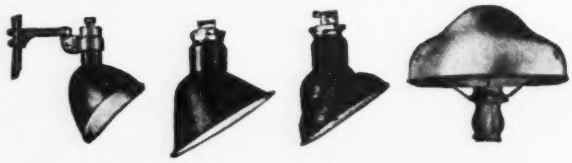

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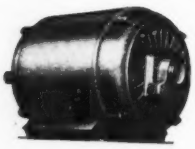

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FISH SANCTUARY BILLS BEFORE LEGISLATURE

Aimed at the city of Tacoma's proposed Cowlitz River power development, two bills to set aside the Lower Columbia as a fish sanctuary were introduced in the January session of the Washington state legislature.

The bills were introduced in both houses. Their provisions would affect all streams and rivers tributary to the Columbia and below McNary Dam, except the north fork of the Lewis River. They would limit construction of any dam higher than 25 ft. and would prohibit any diversion of water below normal level.

The city already has a permit for a projected dam at Mayfield. The state department of conservation and development has said that it will grant permit for the second dam, Mossyrock, if the legislature does not declare the river a fish sanctuary. Should the bill be passed, the Mayfield permit would be revoked, which might mean that the state would have to repay the city for $350,000 spent on engineering studies and permit fees.

Pay Increase Granted Utility Employees

A pay increase totaling about 7% has been granted more than 1,000 employees of the Salt River Valley Water Users Assn. following negotiations in which the union tempered demands because of company financial hardships. The increase is retroactive to Oct. 1.

Throughout negotiations the association was hampered by dry reservoirs and mounting costs which made it necessary to continue the $10 per acre cost to each shareholder. The association pay roll last year amounted to more than $2,500,000 exclusive of overtime and supervisory costs.

● A WAGE INCREASE of 5%, with a top limit of $25 per month, was approved last month for 9,475 employees of the Los Angeles Department of Water & Power. The adjustment was recommended by S. B. Morris, general manager and chief engineer, because of increased living costs. Effective Feb. 1, the action will increase the pay roll by $143,000 monthly.

● CONDEMNATION SUIT of the Snohomish County PUD against the Puget Sound Power & Light Co. will be held in federal court at Seattle, Wash., on Aug. 16. The trial judge has yet to be named.

5 Wiring Ideas ...TO BRIGHTEN YOUR PLANS

A specific wiring material for a specific job—that's the new idea in planning for a productive, profitable drafting room. To help you make the right choices every step of the way—we've picked five tailor-made ideas right off your General Electric distributor's shelves. Look them over for real help in your planning job.

1. UNDERFLOOR WIRING is the ideal system for this kind of equipment. G-E Fiberduct raceways or Q-Floor Wiring provide for outlets in the floor practically anywhere, any time they're needed. As room arrangement is changed—as desks are moved—as electrical appliances are added—outlets can be moved or added, too, in a matter of minutes. For a drafting room that keeps pace with the times, give it flexibility with G-E Fiberduct or Q-Floor Wiring.

2. MERCURY SWITCHES are General Electric's silent switches you've heard so much about. They're made for spots where people constantly flip lights ON and OFF. After years of operation, they keep on doing their job well. A pool of mercury flows from the open to closed position silently—with no apparent friction or wear. G-E mercury switches fit wherever standard switches fit—carry a full 10-ampere rating.

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3. TYPE TW WIRE. Here's another good bet for the installation that's going to stay modern in the years ahead. Small-diameter, long-life General Electric Type TW wire conserves space in conduit—leaves room for additional wiring later on, without additional raceways. This smooth, thermoplastic wire is an installation-timesaver, too, because it pulls through conduit easily—makes cutting and stripping a fast operation.

4. CONDUIT, of course, should be General Electric White—the rigid conduit that's hot-dip galvanized to stand up through the years. Wherever installation plans call for long life and low maintenance costs, specify G-E White.

5. HEAT-RESISTANT Deltabeston* fixture wires are a "must" in a location like this. Where lamps burn continuously, heat-beating Deltabeston wires are a wise precaution. Make sure they're part of every fixture you buy. And, to make your fluorescent installation complete, specify G-E Watch Dog* starters. They automatically cut out blinking lamps—keep lighting continuous and even.

Why not get the habit of looking to your General Electric distributor for ideas and advice—as well as for wiring materials? He has a full line of materials to choose from—and a wide range of experience he'll gladly share with you. Contact him for information—or write to Section K14-225, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

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COURT REFUSES TO ORDER SPACE HEATING SERVICE

Referring back to a ruling 30 years ago by the state supreme court that the state department of public utilities must act on such cases before any court can take jurisdiction, Superior Judge Robert M. Jones at Seattle, declined to order Puget Sound Power & Light Co. to provide electricity for space heating in a home.

Eric and Grace Friedrich had asked the court to issue a writ of mandamus compelling the company to serve the electric space heaters they had installed recently in their Seattle home. They also asked damages of $1,000 daily since the day the power company disconnected the wires.

Counsel for the company stated that no electricity is being delivered to the Friedrichs' space heaters because of the necessity of protecting its service to other customers. Counsel for the Friedrichs said they either will go to the state department of utilities or the state supreme court.

Fisheries Commission Sees Threat to Salmon

Destruction of the $35 million sockeye salmon industry in the rivers and lakes of British Columbia is threatened by hydroelectric power developments, according to officials of the International Pacific Salmon Fisheries Commission.

The projects, it is claimed, are now being investigated by interests from Britain and eastern Canada. The information was laid before the Board of Trade of New Westminster, B. C., recently by commission members.

Although direct information is lacking, the officials said commission crews had met crews of the power development projects in the past year. They name three places as in danger through the development: Chilco spawning area, where 26 acres worth $92,000 an acre to the salmon industry would be destroyed; Eutsuk and Whitesail Lakes on the central coast and Tahtsa Lake nearby.

Speakers included Tom Reid, M.P., commission member; B. M. Brennan, chairman; Milo Bell, chief engineer, and A. C. Cooper and R. I. Jackson, engineers.

● Clark County (Wash.) PUD has sold a $1,000,000 revenue bond issue to the Ballard-Hassett Co. of Des Moines, Iowa, for an effective interest rate of 3.58%. The bonds will be retired over a 30-year period.

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with cable, it isn't the cost
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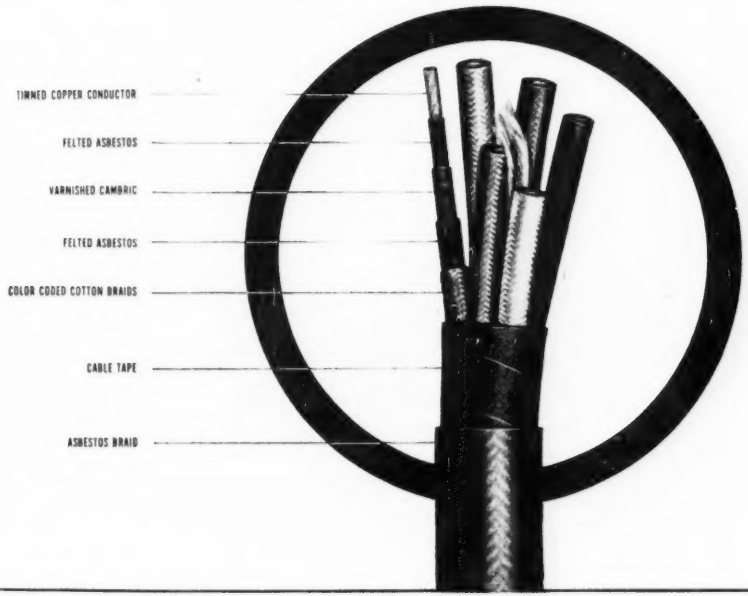

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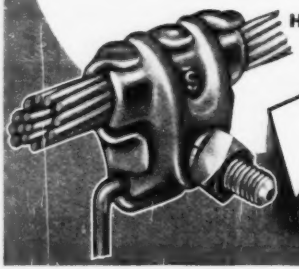

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COOPERATIVE ASKS PERMIT FOR UTILITY PURCHASE

Consumers' Non-Profit Corp., a PUD-sponsored cooperative headed by Monte J. King of the Skagit PUD, has asked the Washington State Department of Public Utilities for permission to purchase most Puget Sound Power & Light Co. properties in King and Pierce counties.

The proposed price is reported to be in the neighborhood of $25,000,000. It does not include generating plants at Electron and on the White and Snoqualmie rivers nor transmission facilities, which presumably would be purchased by individual PUDs.

As King and Pierce counties have no PUDs, the Consumers' Corp. was formed several years ago to facilitate a system-wide purchase plan.

Frank McLaughlin, Puget Power president, criticized the application as "putting the cart before the horse" because the company has not received any purchase proposal covering such a transaction. "Until it does there is nothing to talk about," he said. "There have got to be two parties to such an arrangement to give it substance. With the Snohomish County PUD condemnation case set for trial on Aug. 16, it is not clear to me how an overall purchase proposal can be made."

McLaughlin branded the reported $25,000,000 figure "perfectly ridiculous."

April Date Set for Trial In Contractors Case

A motion to dismiss having been denied, trial of the Seattle Electrical Contractors Assn., eleven of its members and four Seattle electrical equipment corporations on charges of conspiring to restrain trade is scheduled for April in federal court at Seattle, Wash.

The defendants also failed in efforts to strike out certain parts of the information and to secure a bill of particulars on 25 different points. One defendant, Frank T. Holert Jr. of Holert's Electrical Service, was successful in a motion to suppress eight documents obtained from one of his employees.

● Imperial Irrigation District of El Centro, Calif., is preparing to submit a $12,500,000 bond issue to voters for its 1949 power development program. In this connection, the California District's Security Commission is being asked for approval of the feasibility of the project.

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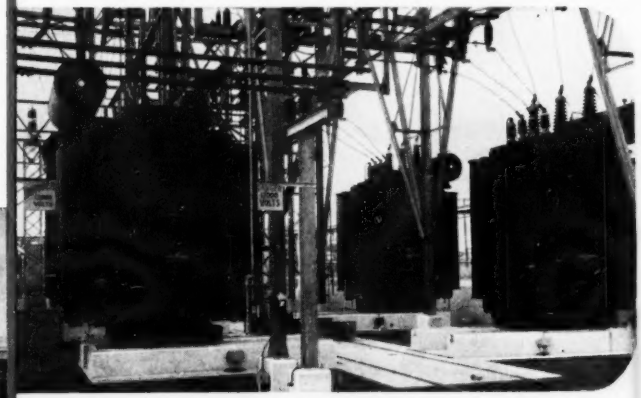
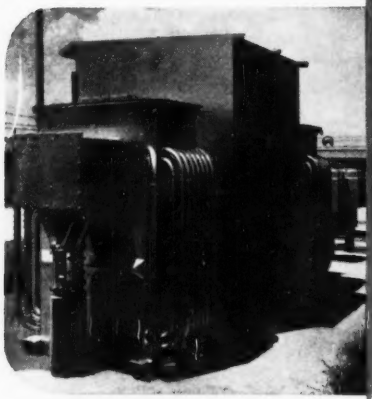
This bank of Wagner Power Transformers is part of the main substation at the Houston, Texas Refinery of Shell Oil Company, Inc.





A Wagner Unit Substation, one of several small substations serving in the same plant.

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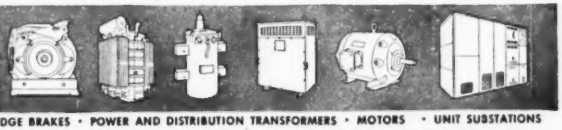

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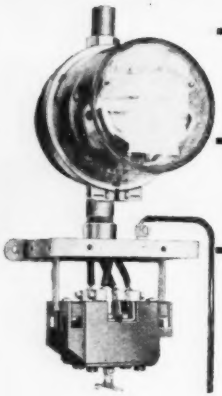

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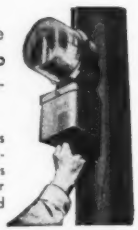

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NEWS ABOUT PEOPLE

● Lewis A. "Tam" McArthur has retired from active service with Pacific Power & Light Co. A member of the Pacific staff from the company's beginning and general manager for many years, McArthur helped build the system, and is well versed in the uses of electric service, particularly in the residential field. He was vice-president from 1922 until last November and a director from 1922 to 1947, when the merger between Northwestern and Pacific became effective. He is an authority on geography and mapping and author of a book on Oregon place names. As an active member of the National Reclamation Assn., he has worked for many years for sound reclamation of the Wests' arid lands.

● David F. Wisdom has resigned as vice-president and general manager of the Pacific Co., of Honolulu, distributors. He will continue with the company as a director. Robert Curtis, who had been manager of Home Budget Store, has been appointed to Wisdom's position.

● W. P. Gullander has been appointed manager of the Seattle district of General Electric Supply Co. He has been with the firm for 19 years, serving 15 years in Schenectady, and more recently has held the position of secretary-treasurer in Bridgeport, Conn.

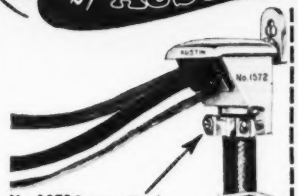
● J. C. Belloni, Berkeley, has been appointed Pacific Coast district order service manager for Westinghouse Electric Corp.

● Ross E. Gilliand has resigned as executive vice-president of Electrical Distributors, Ltd., Honolulu, to return to the mainland.

● Harold Woodard Derry, manager of the new industries department of Pacific Power & Light Co., died at Portland recently. He had been with the company nine years and was well known for his efforts in bringing new industries to the area his company served.

● George L. Drennan, retired field superintendent of Pacific Power & Light Co., died at Walla Walla, Wash., Dec. 24. He joined the Pacific organization in 1910, the year it was organized.

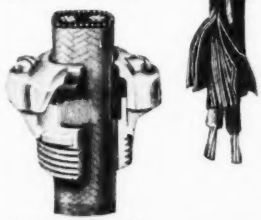
ENTRANCE CAPS AND FITTINGS of Rustproof Cast Aluminum Alloy by AUSTIN



No. 1572 Entrance Head. Key-hole mounting bracket for easy attachment to building.

No. 275 One Hole Strap for oval-shaped cable.

No. 2275 Two Hole Strap for oval-shaped cable.



No. SO-36 Watertight Connector. Cutaway view illustrates how 3-point compression forces rubber gland around entire circumference of cable.

No. GR-1 Grounding Ring. For bonding meter box to artificial ground. Tight connection and positive bond without soldering.

No. 6009 Non-watertight Connector. Takes a wide range of sizes and types of cable, round or oval, without the use of shims or inserts.

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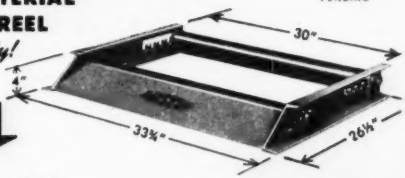
PATENT PENDING



AUSTIN No. 600 REEL ROLLER

MAXIMUM CAPACITY: 4000 LBS. WEIGHT: 75 LBS. EACH

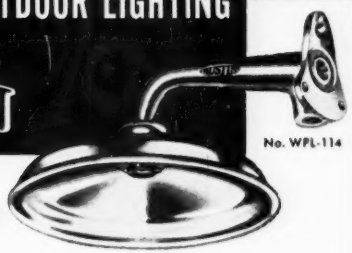
OUTSTANDING ADVANTAGES:

1. Ramp makes loading fast and easy
2. Five adjustable slots take various reel diameters
3. Thumb screw locks front roller for reel removal
4. Single unit takes reels up to 30" wide
5. Bolt two units together for reels up to 64" wide
6. Higher back roller prevents reel from coming off roller when material is dispensed
7. Reel rolls on grease packed flanged ball bearings
8. Bright orange finish makes reel readily visible—helps to eliminate accidents
9. Use on the job, truck, or in warehouse

The M. B. Austin Company
NORTHBROOK, ILLINOIS

3144

For the best in OUTDOOR LIGHTING install the new AUSTIN DELUXE YARD LIGHT



No. WPL-114

BUILT FOR LONG RELIABLE SERVICE IN ALL KINDS OF WEATHER

The finest outdoor lighting fixture available, AUSTIN'S new WPL-114 consists of sturdy, rustless cast aluminum bracket and 14-inch heavy gauge steel reflector with baked porcelain enamel finish—green outside and white inside. Reflector rigidly mounted to fixture arm—can't vibrate or break loose. Bracket fitted with ½" conduit threaded hub in back and bottom. Keyhole slot in top of bracket for easy mounting.

AUSTIN No. SPB-12 YARD LIGHT
Straight bracket for pole or wall mounting —12" reflector. Also available with 14" reflector (No. SPB-14).

AUSTIN No. SWB-12 YARD LIGHT
Straight bracket with adjustable mounting flange—12" reflector. Also available with 14" reflector No. SWB-14).

All Austin yard lights come completely packaged with three lag screws, wire and Duxseal compound, ready to be wired and installed.

The M. B. Austin Company
NORTHBROOK, ILLINOIS

3163

BLACKBURN
Hi-Strength
GROUND ROD CLAMP

3 Big Features!

Truly High Strength! Body and set screw are made of DURONZE III—50% stronger than other alloys. Hence, clamp will not distort—will stay tight.

A Heavy Clamp in the Lowest Price Range.

Pressure Bar Aligns Wire with rod and distributes pressure of set screw over a greater length of wire, making a very low resistance connection.

For better performance specify
BLACKBURN
Hi-Strength Ground Rod Clamps

BUILDERS OF QUALITY PRODUCTS FOR 15 YEARS
JASPER BLACKBURN PRODUCTS CORP.
FIRST, MADISON & CLINTON STS. • ST. LOUIS 6, MISSOURI

ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA
STEEL & WIRE CO.
MUNCIE, INDIANA

THE 17th ANNUAL MANUFACTURERS' DIRECTORY will be published as a separate supplement to the APRIL 1949 issue of ELECTRICAL WEST. It will make available in a handy and convenient form information about Western representatives and Western branch offices.

FOR SALE
HYDRO-ELECTRIC GENERATING UNITS
AVAILABLE SOON

2—705 KVA 2300 V. 3 phase 60 cycle Fort Wayne generators direct connected to horizontal shaft, double opposed Francis type turbines manufactured by Pelton. Rated at 45 foot head. Woodward governors. Belt driven exciters. Installed in 1911.

1—1875 KVA 2300 V. 3 phase 60 cycle Westinghouse vertical shaft generator, driven by Wellman-Seaver-Morgan turbine. Rated at 49.4 foot head. Woodward governor. Installed in 1924.

1—Motor-generator set.
Essential switchboard equipment.

Now Operating and Available for Inspection
Scheduled for Permanent Shut-Down in May, 1949, to Make Room for Higher Head Automatic Plant

Address inquiries to
R. B. Boals, Supt. Eugene Water Board
Eugene, Oregon

MOTORS, GENERATORS, TRANSFORMERS

1—1500 H.P.
Bought and Sold
New and Rebuilt

ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

NOTES ON THE TRADE

● THE MARYON & WILLIAMS CO., manufacturers' representatives with offices at the Los Angeles Furniture Mart and the Western Merchandise Mart in San Francisco, has announced that the firm has dissolved. The partners will operate independent offices. The George H. Williams Co. will maintain its office and showroom at the Los Angeles Furniture Mart, and will serve as representatives for Conlon washers, ironers and Copeland refrigerators in southern California. The Arthur C. Maryon Co. will headquarter at the Western Merchandise Mart, San Francisco, will handle Conlon and Copeland products in northern California.

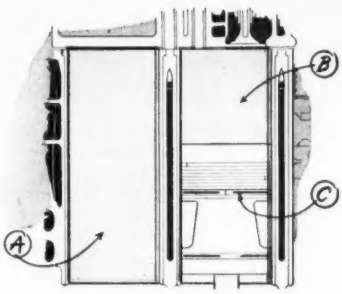
● Fred Hodge, former assistant vice-president and manager of divisions for Portland General Electric Co., and who before that was sales manager for Sierra Pacific Power Co. at Reno, left the utility business after 10½ years and started his own business to service and repair electrical appliances in Oregon. He has 17 people, operates 14 service cars to repair electric ranges, water heaters, refrigerators and other appliances in the Portland area. Company is known as Electric Home Service Co., at 1740 S.E. Hawthorne, Portland 14.

● Ken Ryals has announced the formation of a new company, the Ryals Electric Co. in San Francisco which will engage in electrical contracting and will also have a manufacturer's agency business. James Turner will be in charge of the latter. The Stone-Ryals Electric Co. will be continued under the name by Ryals' former partner, H. C. Stone, and will manufacture and design production equipment, such as the Stryco spot welder.

● Dan H. Radke, at 754 Natoma St., San Francisco, has been appointed representative in northern California and northwestern Nevada for Ruby Lighting Corp. of Los Angeles. He is also representing S & M Lamp Co. and Marvin Mfg. Co. in the same territory.

● Coleman Co., Inc., Ltd. of Honolulu has been appointed territorial distributor for Crosley appliances. Ford Denslow, manager of Coleman Co., announces. Appointment was made recently by Tye M. Lett Jr., Crosley director of exports, on a visit to Hawaii.

Case D119E--Reducing Wear on Liners in Diesels



DIESEL ENGINE LINERS AND PISTON

In high-speed Diesel engines lubricated with RPM DELO Diesel Engine Lubricating Oil, wear on liners was held to a minimum with little variation over their entire areas. A constant lubricating film was maintained on them even in high-temperature belts. RPM DELO Oils are recommended for all types of Diesels. Come in all viscosity grades necessary for your engines.

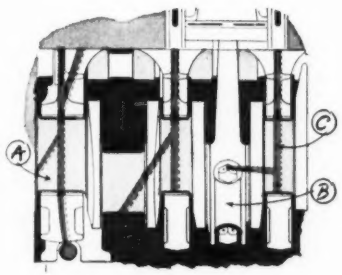
A. Special additive provides metal-adhesion qualities...keeps oil on all parts whether hot or cold, running or idle.

B. An anti-oxident resists formation of lacquer—resistance to extreme heat provides lubrication in the toughest conditions.

C. Contains detergent which keeps rings clean and operating freely...prevents scratching and gouging of liners.

RPM DELO Diesel Oil will not corrode any bearing.

Case D119F--Prolonging The Lives of Diesel Bearings



SECTION OF DIESEL ENGINE CRANK AND CAM

No bearing failures occurred between overhaul periods in Diesel engines used in the toughest service when they were lubricated with RPM DELO Diesel Engine Lubricating Oil.

A. Non-corrosive to all types of bearing metal...inherent ability of base stocks and added compound resist oxidation and formation of acid which is common cause of bearing corrosion.

B. Maintains a tough lubricating film which withstands excessive shocks and pressures.

C. Special detergent compound keeps oil passages clean and open - allows free flow of lubricant to vital points.

Another compound in RPM DELO Oil prevents foaming of the oil. An accurate measurement of crankcase levels can always be obtained.

STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20, California.

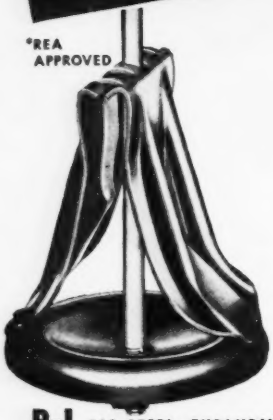
STANDARD OF CALIFORNIA

DIESEL ENGINE RPM DELO LUBRICATING OIL

Trademark Reg. U. S. Pat. Office

P-L* EARTH ANCHORS

*REA APPROVED



P-L ALL STEEL, EXPANDING TYPE EARTH ANCHORS

Here is the first really efficient, two-piece earth anchor that is of simple, fool-proof, all-steel, heavy-duty construction. P-L Earth Anchors are exceptionally rugged and possess tremendous holding power. P-L Anchors can do a better job and can be installed quicker in all types of soil. Everyone from the engineer to the lineman can appreciate the ease of handling and installation.

EASY TO INSTALL

P-L Anchors come to you as assembled units. Built of two simple pieces of heavy steel plate. A few blows of the tamping bar and the sharp edged blades cut deeply and permanently into solid, undisturbed earth.

FOR LITERATURE WRITE

PIEPER-LILLARD INCORPORATED ST. LOUIS 1, MO.

Demonstration truck outfitted by Cole Electric Co. shows the advanced line of switches made by this southern California manufacturer. At present the truck is on the northern California leg of a Pacific Coast tour. It is here shown with Don and Bob Ingalls of C. E. Ingalls & Sons, northern California distributors for Cole Electric Co., making demonstration for power company engineers

● MOMSEN, DUNNEGAN AND RYAN, appliance and hardware wholesaling firm in Phoenix, has been purchased from Dunnegan and Ryan by Momsen brothers and associates. The firm's new officers are Gus Momsen, president; Rueben F. Momsen, vice-president and treasurer; Leo J. Momsen, vice-president and secretary; A. A. Martin, vice-president; and A. J. Murray, vice-president and sales manager. The firm also has offices and warehouses in Albuquerque, N. M., and El Paso, Texas.

● APPOINTMENT of T. Lynn Harp to the position of technical sales representative for the general sales department of Columbia Steel Co. has been announced. He will assist division sales organizations in marketing wire and wire rope products.

● ADRIAN GREENBERG, former appliance buyer at Union Furniture Co., San Francisco, has joined Saltzman-Stanley Co., 739 Mission St., San Francisco, and will specialize in kitchens, disposers, dishwashers and television, merchandising under the slogan "Designs for better kitchen living—by Adrian." Before working with Union Furniture, Greenberg was southern California regional manager of Maytag. He is succeeded at Union Furniture by George Roehrig.

● MAYDWELL AND HARTZELL has announced the following personnel changes: Richard G. Harris will retire as district manager of the Seattle office effective March 1; Edmund J. Reichwein, now sales engineer at Seattle, will assume the post of Seattle district manager; John E. Doyle, now associated with the San Francisco district, moved to Sacramento Feb. 1 to become district sales representative in that city, covering the northern California and Nevada areas.

● DAVID J. HOPKINS has been appointed sales representative for the state of California by Emerson Radio & Phonograph Corp., according to Benjamin Abrams, president.

● REFRIGERATION SUPPLY CO., Billings, Mont., has moved into new and enlarged quarters at 17 N. 31st St., it was announced by Norm Sulenes, manager of the firm.

● MILTON FRENCH, who has been Fresno area representative for the Schuyler-Wilson Co., has joined the Thor Corp. and will represent it in that territory.

● JOHN KELLY has been appointed to head the newly created advertising and sales promotion department of the J. N. Ceazan Co., San Francisco.

● F. B. CONNELLY CO., Portland, distributor of electrical appliances., has moved to larger quarters at 905 N. W. 12th Ave.

● H. E. BLACKBURN has been appointed Western sales manager of Telechron Inc.

Powerful argument for men who buy cable...

KERITE lasts a long, long time . . . stands up well under most any conditions of temperature, weather, moisture, etc. . . . is good security against service outages . . . saves you money.

In short, Kerite makes your cable dollars go farther. *That*, we think, is a powerful argument for anyone who buys cable.

We can back it up with other powerful arguments, too. For instance—we can show you samples of Kerite cable more than 60 years old that are still mechanically and electrically in first-class condition. And we can point out that the same wonderful ingredient—Kerite—is used in the cable we make today as was used in that cable which has stood up so well.

And we might mention that no matter how old a company may be, it has to stay young to merit the continued business of astute buyers.

These powerful arguments—we think—will demonstrate why Kerite cable assures you of low cost per year. When you buy Kerite, the facts will back up your judgment—and the performance will bear it out. The Kerite Company, 30 Church Street, New York 7, N. Y.

Kerite Insulation—Your Cable's Best Life Insurance

KERITE CABLE

ADVERTISING INDEX
February 1949

Allis-Chalmers Mfg. Co. 13, 16, 17, 28, 29, 63
American Steel & Wire 4, 5
Anaconda Wire & Cable 27
Appleton Electric Co. 148
Austin Company, M. B. 161

Blackburn Products Corp., Jasper 162
Brewer-Titchener Corp. 64
Briegel Method Tool Co. 66
Buckingham Mfg. Co., Inc. 52
BullDog Electric Products Co. 23
Burndy Engineering Co., Inc. 31

Classified 162
Condon Company, Earl S. 138
Copperweld Steel Company 7
Crescent Ins. Wire & Cable Co. 32
Curtis Lighting, Inc. 141

Driver-Harris Company 35

Electric Equipment Co. 162
Electrical Engineers Equipment Co. 68
Electrical Specialty Co. 154
Everstick Anchor Co. 152

Federal Electric Products Co. 8
Four Wheel Drive Auto Co. 61

G & W Elec. Specialty Co. 18
General Electric Co.:
Bridgeport, Construction Matls Div. 155
Cleveland, Lamp Division 136, 137
Schenectady, Apparatus Division 1, 25, 33, 36, 37, 45, 56, 57
General Electric Supply Corp. 143
General Switch Corp. 38
Graybar Electric Co. 30
Guth Company, Edwin F. 44

Helwig Company 146
Honn Company, George E. 158
Hubbard and Co. 9

Ideal Industries, Inc. 48
Ilsco Copper Tube & Prod., Inc. 160
Indiana Steel & Wire 162
Industrial Electronics Corp. 146
Insulation Mfgrs. Corp. 34
Irvington Varnish & Ins. Co. 42

Jeffries Transformer Co. 154
Jones Metal Products Co. 154
Joslyn Pacific Co. 53

Kearney Corp., James R. 14
Kees Mfg. Co., F. D. 160
Kerite Company 165
Kett Tool Company 152
Kyle Division, Line Material Co. 20, 21

LaMoree, C. D. 156
Line Material Company 3, 20, 21

Monarch Malleable Iron Range 133
Matthews Corp., W. N. 142
Maydwell & Hartzell, Inc. 58
Meter Devices 138
Miller Company 156
Mineralac Electric Co. 158
Moloney Electric Co. 40, 41

National Tele Supply Co. 55
New England Mica Co. 154

Ohio Carbon Company 60
Okonite Company 19
Oliver Iron & Steel Corp. 147
O. Z. Elec'l Mfg. Co. 22

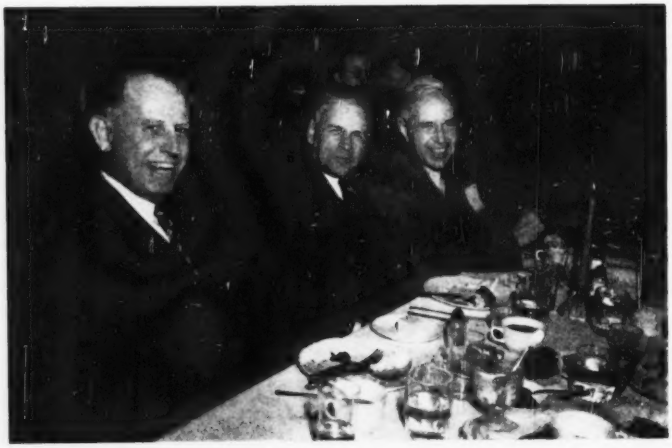
Pacific Coast Electrical Assoc. 4th Cover
Pacific Electric Mfg. Corp. 26
Pacific Gas and Electric Co. 3rd Cover
Pelton Water Wheel Co. 39
Pieper-Lillard, Inc. 164
Pittsburgh Reflector Co. 151
Porcelain Insulator Corp. 53
Pyle-National Company 140

Roberson Company, L. N. 160
Roebling's Sons Co., John A. 49
Rockbestos Products Corp. 157
Rome Cable Corp. 15
Russell & Stoll Co., Inc. 156

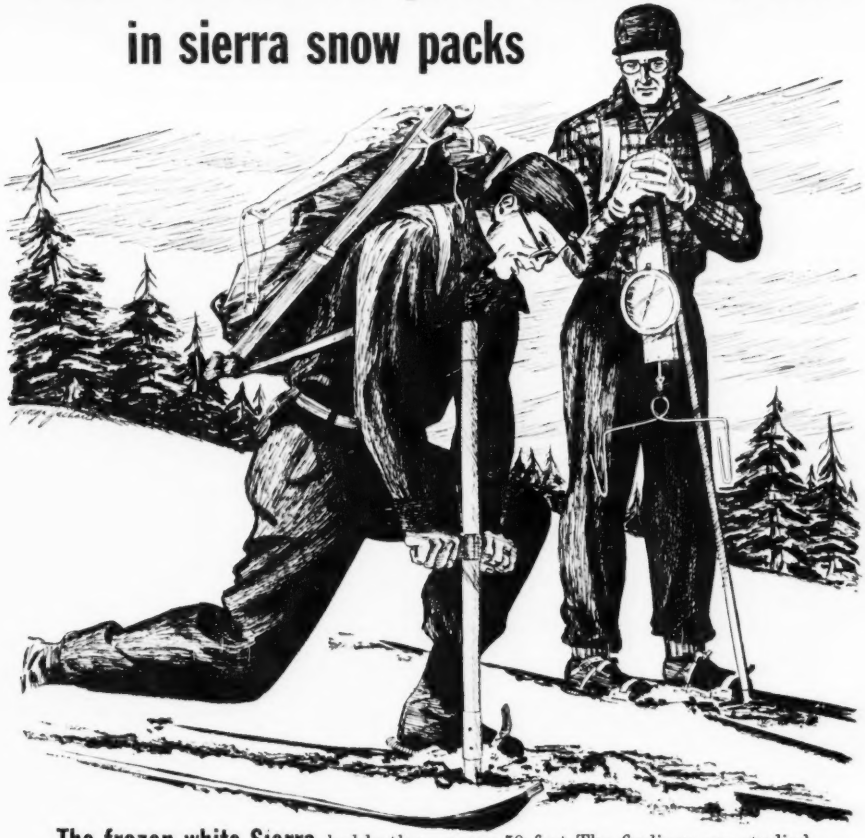
S & M Lamp Company 54
Sangamo Electric Co. 46, 47
Sherman Mfg. Co., H. B. 158
Simplex Wire & Cable Co. 24
Slater Electric & Mfg. Co. 50
Smithcraft Lighting 135
Smoot-Holman Company 153
Solar Electric Corp. 160
Southern California Edison Co. 2nd Cover
Spang-Chalfant Div., Nat'l Supply 12
Square D Company 67
Standard Oil Company 163
Thomas & Sons Co., R. 59
Union Pacific Railroad Co. 65
U. S. Rubber Company 51
U. S. Steel Corp. 4, 5
Van Luven, H. H. 152
Victor Insulators, Inc. 6
Wagner Electric Corp. 159
Westinghouse Electric Corp. 10, 11, 43, 144, 145
Wesix Electric Heater Co. 139

PROFILES

Stanley M. Johns, Salt Lake City manager for Westinghouse Electric Corp., has just been elected president of the Intermountain Electrical Assn. Johns (right) presented an excellent talk at the Idaho State Electrical Contractors Assn. meeting. Below, Art Darby, Westinghouse Electric Supply; Ralph Gale, Idaho Power, and Rudy Belnap, General Electric Supply Corp., at the banquet of that contractors convention at Nampa. At the bottom of the page are the stalwarts of the Southern California Chapter, International Association of Electrical Inspectors, which held a meeting in Southgate Jan. 26. They are, left to right, Art Veit, Charles Donohue, Ed Muller, Frank Short. Donohue, Orange County inspector, was last year's chapter chairman; Muller is its secretary-treasurer



How P. G. and E. ski patrols measure water in sierra snow packs



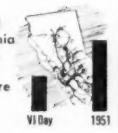
The frozen white Sierra holds the secret of how much water and hydro-electric power California will have in the rainless summer months ahead... and P. G. and E. snow surveyors know how to dig out the answer. They ski up to 20 miles a day, "measuring" the snow every 50 feet. The findings are studied by our hydro-engineers, who can then determine—within 10%—exactly how much water will be available after the spring thaw. First step is to plunge a 20-foot aluminum tube like this deep down into the snow pack.

Weighing the sample comes next. The amount of water varies with the density of the snow... and heavy, hard-packed snow stores up a greater volume of water than loosely-packed drifts.

This giant reservoir saves the precious water as snow melts. And then it's released as needed, creating more power for California homes and businesses and more water for farm irrigation.

For the record

By 1951, Northern and Central California will use *twice* the power it needed before the war.



To meet this growing demand, P. G. and E. already has added nearly 500,000 new electrical horsepower...and we are building nearly 1,500,000 more!

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

EW 102-249

set your sales course by

the sign of **ADEQUATE WIRING**

In making your plans for steady appliance sales, the sign which says "Adequate Wiring" is a good star to steer by. The homes which display it are your best prospects. They are wired for convenient, efficient and economical use of every appliance—tomorrow's as well as today's—with plenty of circuits, outlets and switches.

Adequate wiring is a source of profit to every appliance dealer. It helps him steer clear of lost sales through unsatisfactory performance or troublesome installation. It keeps the trade winds blowing!

PACIFIC COAST ELECTRICAL ASSOCIATION

601 West Fifth Street, Los Angeles 13, California • 447 Sutter Street, San Francisco 8, California